PRELIMINARY ASSESSMENT

of

FARED (ROBOT) SYSTEMS

(TXD987996782)

Prepared By

Tom Ritchie, FIT Geologist

ICF Technology, Inc.
Region VI

August 9, 1991

PRELIMINARY ASSESSMENT
of
FARED (ROBOT) SYSTEMS

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1. SITE INFORMATION

The Region VI Field Investigation Team (FIT) was tasked by the U.S. Environmental Protection Agency (EPA) under Technical Directive Document (TDD) F-06-9008-06 to conduct the Preliminary Assessment (PA) of Fared (Robot) Systems (TXD987996782) in Fort Worth, Tarrant County, Texas.

1.1 SITE LOCATION

Fared (Robot) Systems (FRS) was located at 7410 Pebble Drive in Fort Worth, Tarrant County, Texas 76181-5579 (Ref. 1, p. 1). FRS' geographic coordinates are 32°47'38" north latitude and 97°13'13" west longitude (Figure 1) (Ref. 2).

1.2 SITE BACKGROUND

FRS was located in 95,000 square feet of office and manufacturing space now occupied by Allied Electronics (Appendix A, Photograph 3) (Ref. 1, p. 1). FRS was privately owned and operated by Harold Spindle (Ref. 1, p. 1). Mr. Spindle also served as FRS' president. The office space in which FRS was located is owned by Newell and Newell Corporation (Ref. 1, p. 3). On November 7, 1989, FRS filed for bankruptcy under Chapter 7 (Case #489-43849-7) (Ref. 1, pp. 1, 6). David Yarbrough was FRS's Manager. His telephone number is (817) 284-3401 (Ref. 1, p. 3).

2. BACKGROUND AND OPERATING HISTORY

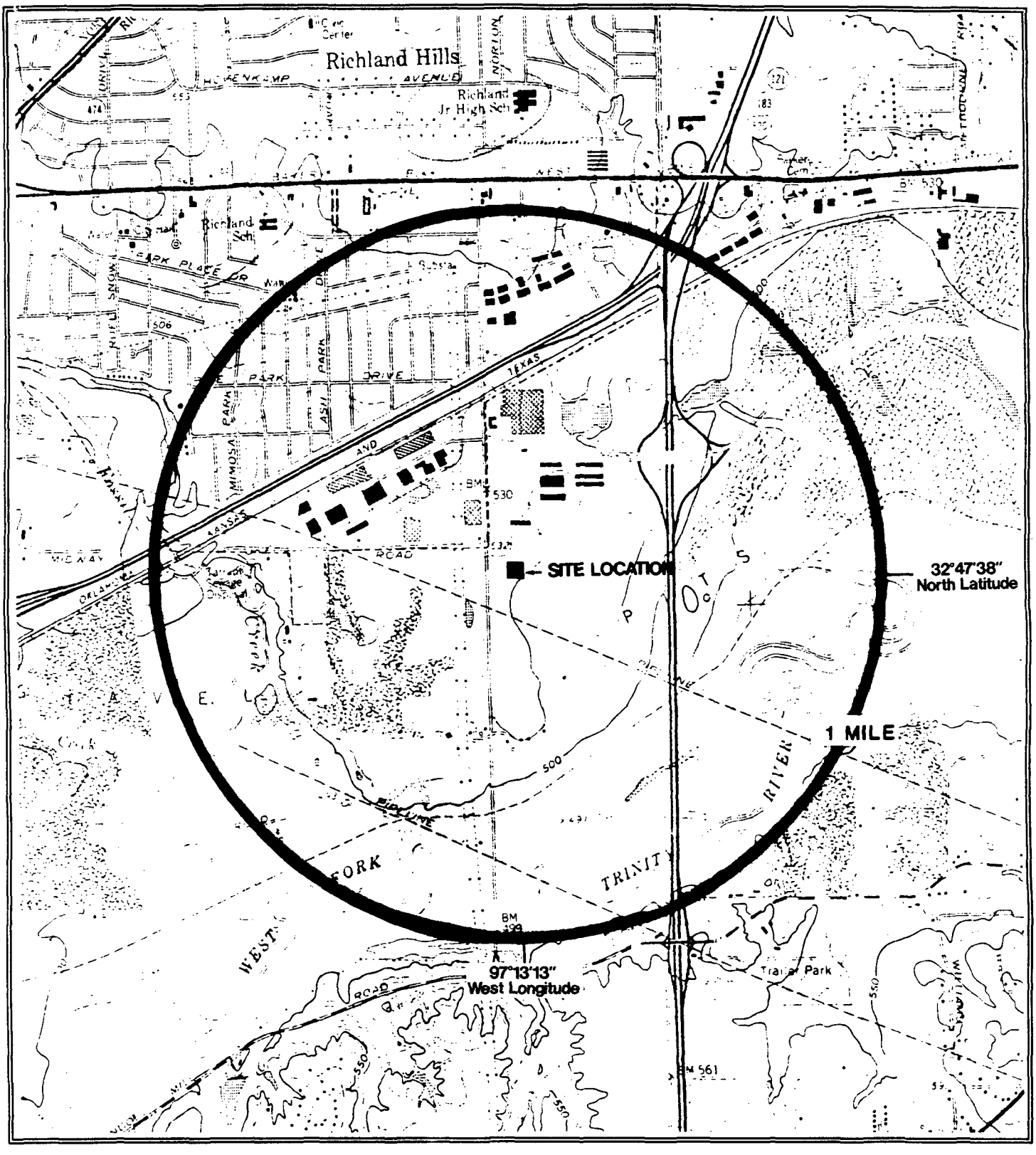
This section addresses site history and operations, known and potential problems, and regulatory involvement of federal, state or local agencies.

2.1 SITE HISTORY

FRS began operations in July 1982 and was incorporated in September 1983 (Ref. 5). FRS filed for bankruptcy (Chapter 7) on November 13, 1989 (Ref. 1, pp. 1, 6). FRS manufactured robot systems used for assembling lightweight products (Ref. 1, p. 1). Most of the components used were not manufactured at the facility; however, some were machined, welded and painted at the site (Ref. 1, p. 1; Ref. 6, p. 1).

On September 8, 1987, FRS filed a Notification of Hazardous Waste Activity with the EPA to comply with Section 3010 of the Resource Conservation and Recovery Act (RCRA). The notification stated that FRS generated less than 1,000 kg per month of hazardous waste (Ref. 1, pp. 3-4).

FRS operated an on-site waste management facility. It consisted of miscellaneous storage containers and contained methyl ethyl ketone, lacquer thinner, liquid paint wastes and naphtha (Ref. 7, p. 2). These wastes were also disposed off-site (Ref. 7, p. 2). Specific information pertaining to waste storage location and disposal practices is not documented in available files.



N

0 2,000 FT

SCALE 1 : 24,000

FIGURE 1
SITE LOCATION MAP
FARED (ROBOT) SYSTEMS
FORT WORTH, TEXAS
CERCLIS NO. TXD987996782

QUADRANGLE LOCATION

HURST QUADRANGLE

2.2 KNOWN AND POTENTIAL PROBLEMS

FRS was identified through bankruptcy notification (Ref. 1, p. 1). CERCLA, RCRA and Texas Water Commission (TWC) files were searched for available information. These files do not contain records of any violations, problems or enforcement actions pertaining to FRS.

Potential contaminants of concern include wastes U159 (methyl ethyl ketone), U220 (toluene), U239 (dimethyl benzene), U154 (methyl alcohol), U002 (acetone), U165 (naphthalene), U057 (cyclohexanol), U161 (4-methyl-2-pentanone), U231 (2,4,6-trichlorophenol), D007 (chromium), D008 (lead), D001 (ignitable substances), F003 and F005 (Ref. 1, pp. 1, 5; Ref. 6, pp. 1-18).

An off-site reconnaissance inspection was conducted by the FIT on October 8, 1990. The facility was not fenced and access was unrestricted (Appendix A, Photographs 3-6, 8-9). Allied Electronics, Inc. was the occupant of the facility (Appendix A, Photograph 3). A 3 foot high berm is located on the south and west sides of the site (Appendix A, Photographs 6, 11). Drainage from the parking lot entered a small pond on the southeast corner of the site (Appendix A, Photographs 1-2, 9). An iridescent film was noted on the pond water next to the parking lot drain (Figure 2) (Appendix A, Photograph 10). The source of the film could not be determined by the FIT.

2.3 REGULATORY INVOLVEMENT.

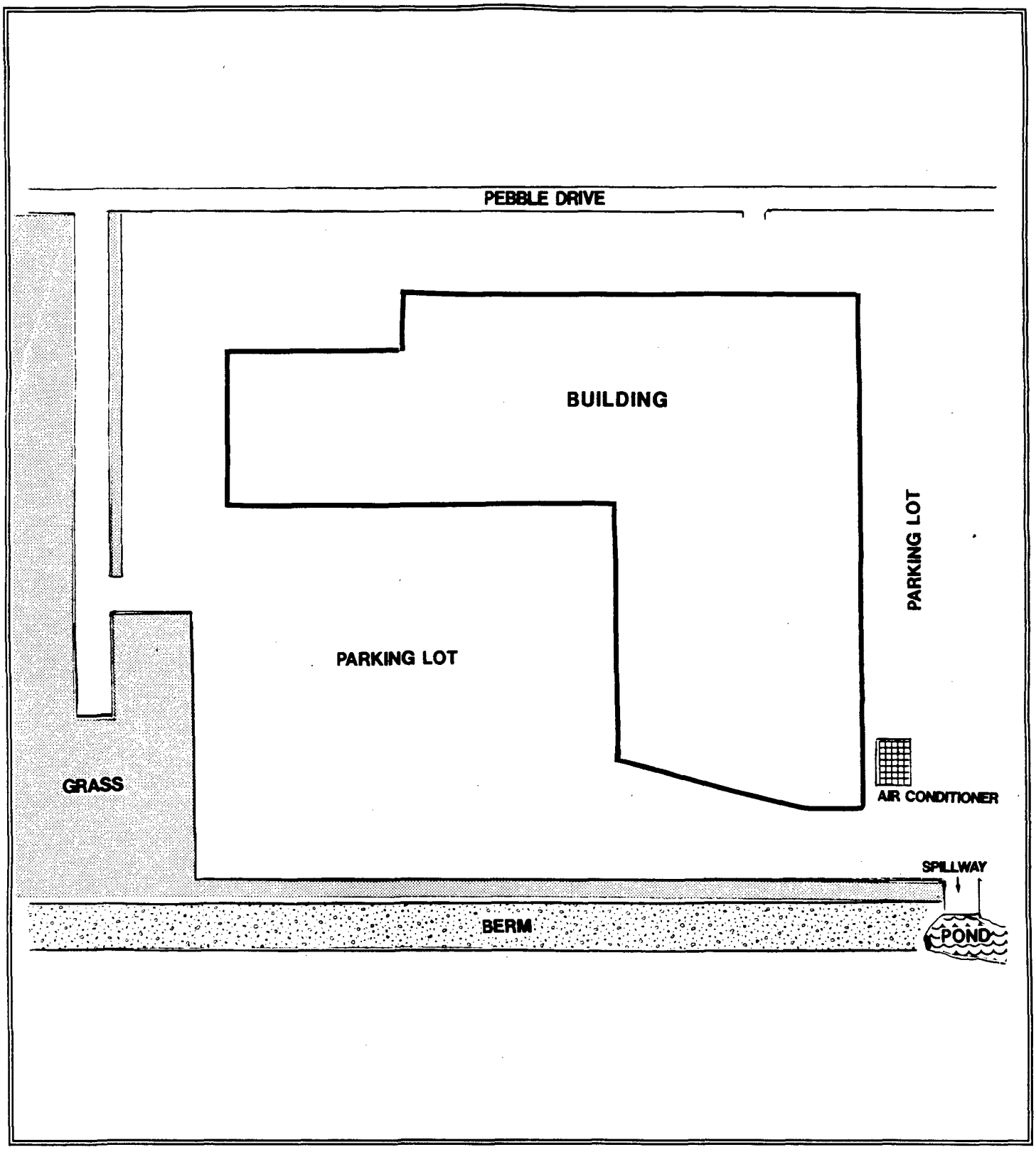
FRS filed a Notification of Hazardous Waste Activity with the EPA on September 8, 1987 (Ref. 1, pp. 1, 4-5). FRS registered with the TWC as a Small Quantity Generator on August 21, 1987; its TWC registration number is 38093 (Ref. 7, p. 1). FRS filed an Industrial Solid Waste Management Inventory Initial Notification with the TWC on October 1, 1987. The notification stated that FRS was a small quantity generator of industrial solid wastes. The notification also stated that FRS engaged in on-site waste handling and shipped two loads of waste off-site per year (Ref. 6, pp. 1, 3-5, 7, 9, 11, 13, 15; Ref. 7, p. 1). Specific information concerning shipments of waste off-site and on-site waste handling procedures is not documented in available files.

3. WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION

Documentation, waste generation and containment are addressed in this section.

3.1 DOCUMENTATION

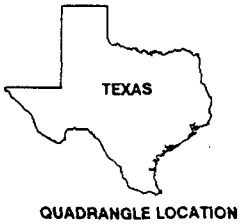
The EPA Notification of Hazardous Waste Activity dated September 8, 1987 identified the type and amount of hazardous waste generated by FRS (Ref. 1, pp. 4, 5). An October 13, 1987 TWC Notice of Registration identified FRS as an active small quantity generator of hazardous waste. The notice also identified FRS as an on-site waste management facility and listed the type of waste generated (Ref. 7, pp. 1-2). A TWC Industrial Solid Waste Management Inventory Initial Notification, dated August 24, 1987, documented the nature of FRS' business and types of wastes generated (Ref. 6).



N

NOT TO SCALE

FIGURE 2
SITE SKETCH
FARED (ROBOT) SYSTEMS
FORT WORTH, TEXAS
CERCLIS NO. TXD987996782



QUADRANGLE LOCATION

3.2 WASTE GENERATION

FRS generated wastes U159, U220, U239, U154, U002, U165, U057, U161, U231, D007, D008, D001, F003 and F005 (Ref. 1, p. 5). The wastes were generated during the process of painting automated equipment (Ref. 6, pp. 1, 5, 7, 9, 11, 13, 15). Waste U159 was used as paint cleaner (Ref. 6, p. 5). Wastes U220, U239, U154 and U002 were used as paint thinner in the spray painting operations (Ref. 6, p. 7). Wastes U220, U239 and U057 were mixed with lacquer thinner and reducer and used in spray painting application (Ref. 6, p. 9). Wastes U165, U231 and 161 were used as paint reducers in spray painting application (Ref. 6, p. 11, 15). Wastes D007 and D008 were used as paint enamel in spray painting applications (Ref. 6, p. 13). Wastes F003 and F005 were generated at non-specific sources (Ref. 1 p. 5). The quantity of waste generated is listed in Table 1. The amount and use of waste D001 are not documented in available files.

3.3 CONTAINMENT

FRS utilized miscellaneous storage containers to store waste on-site (Ref. 7, p. 2). Specific information pertaining to containment and waste handling practices is not documented in available files.

4. PATHWAY CHARACTERISTICS

This section characterizes environmental pathways and evaluates the potential of contaminant migration from the facility.

4.1 GROUND WATER

FRS lies on Pleistocene and fluviate terrace deposits situated in the southern section of the Fort Worth Basin Geologic region (Ref. 3, pp. 4, 6; Ref. 8, p. 11). The fluviate terrace deposits consist of gravel, sand, silt and clay (Ref. 3, p. 6). The terrace deposits dip east and southeast at less than 5 feet/mile (Ref. 8, p. 11). The Trinity Group is the principal water-bearing group of rocks in the region and is divided into the Paluxy, Glen Rose and Twin Mountains Formations (Ref. 9, p. 10). The Paluxy is stratigraphically above the Glen Rose, which is stratigraphically above the Twin Mountains Formation (Ref. 8, p. 7). The Paluxy and Twin Mountains Formations are the principal water-bearing formations of the Trinity Group (Ref. 9, pp. 10, 14). The Paluxy consists of sand and shale and ranges in thickness from 100 feet in the southeast to 400 feet in the northern part of north central Texas (Ref. 9, p. 14). The Twin Mountains consists of a basal conglomerate of chert and quartz which grade upward into sand and shale (Ref. 9, p. 14).

Thickness generally increases down dip and ranges from 200 to 860 feet (Ref. 9, p. 14). The water in both the Twin Mountains and the Paluxy flows toward the east-southeast, generally following the direction of dip (Ref. 9, pp. 36, 39). The sources of water regeneration for both aquifers are precipitation and seepage from lakes and streams (Ref. 9, pp. 36, 39).

In the vicinity of FRS, the depth to water in the Paluxy aquifer (the uppermost principal aquifer) is approximately 430 feet below ground level, and

TABLE 1

QUANTITY AND TYPE OF WASTES GENERATED

WASTE TYPE	*QUANTITY (kg per month)*
U159	30
U220, U239, U154, U002	30
U220, U239, U165, U159, U057	10
U165	30
D008, D007	10
U220, U231, U161	30

the depth to water in the Twin Mountains aquifer is approximately 830 feet below ground level (Ref. 2; Ref. 9, Figures 25 and 31).

The net precipitation in the Dallas-Fort Worth area is 6.7 inches per year (Ref. 20, p. 50)

4.2 SURFACE WATER

Overland migration of water flows southeast across the site and enters a small pond adjacent to the southeast corner of the site (Ref 2; Appendix A, Photographs 2, 5 and 9). The pond is located 50 feet southeast, downgradient from the only building on-site (Appendix A, Photograph 9). Water from the pond enters an intermittent creek, flows east approximately 1½ miles and enters the West Fork of the Trinity River (Ref. 2). The intersection of the creek and the West Fork of the Trinity River is the probable point of entry of the overland migration segment (Ref. 2). The West Fork has an average discharge of 450 cubic feet per second (cfs) (Ref. 13, p. 265).

A large drainage pipe empties into the small pond approximately 20 feet west of the parking lot drain (Appendix A, Photograph 1). The origin of drainage entering the pipe could not be determined by the FIT. No on-site drains were noted by the FIT during the off-site reconnaissance inspection.

The site lies on loamy arent type soil (Ref. 11, p. 17 and Sheet 31). Loamy arent soils are gently undulating, low sloping soils (1-5% slope) which consist of loamy material containing varied amounts of sand, silt, clay and gravel (Ref. 11, pp. 17-18, and Sheet 31). The upgradient drainage area is approximately 75 acres (Ref. 2).

The grounds of FRS and the area around it are classified as areas of minimal flooding by the Federal Emergency Management Agency (Ref. 14). The two year, 24 hour rainfall for Fort Worth is approximately 4 inches (Ref. 15). Other than the iridescent film on the pond next to the parking lot drain, no evidence supporting surface water pathway contamination was found by the FIT (Appendix A, Photograph 10).

4.3 SOIL EXPOSURE

FRS generated wastes F003, F005, U159 (methyl ethyl ketone), U220 (toluene), U239 (dimethylbenzene), U154 (methyl alcohol), U002 (acetone), U165 (naphthalene), U057 (cyclohexanol), U161 (4-methyl-2-pentanone), U231 (2,4,6-trichlorophenol), D007 (chromium), D008 (lead) and D001 (ignitable substance) (Ref. 1, p. 5). All of these wastes were stored on-site and shipped off-site for disposal (Ref. 7, p. 2). FRS stored wastes in miscellaneous storage containers (Ref. 7, p. 2). Specific information pertaining to containment is not documented in available files.

During the off-site reconnaissance inspection, the facility was not fenced and access was unrestricted (Appendix A, Photographs 3-8). The presence of more than 30 cars in the parking lot indicated that the facility is frequently used (Appendix A, Photographs 3-5, 7-9). No evidence supporting soil exposure contamination was found by the FIT.

4.4 AIR

There is no evidence of air permitting or air monitoring documented in available files. The migration of contaminants through the air is possible due to the volatile nature of many of the contaminants used by FRS (Ref. 6). Specific information pertaining to painting operations and ventilation of the building is not documented in available files. Evidence of spills or discharges were not documented in available files or noted by the FIT during the off-site reconnaissance inspection.

4.5 GROUND WATER RELEASE TO SURFACE WATER

The West Fork of the Trinity River, a perennial water body, is located less than 1 mile southeast from the site (Ref. 2). However, the depth to the water table is not known. Therefore, it is not known if ground water is released to surface water within 1 mile of the site.

5. TARGETS

This section characterizes the environmental pathways and associated targets of contaminant migration from the facility.

5.1 GROUND WATER

Ground water from the Paluxy and Twin Mountains aquifers is used for public water supply and industrial and agricultural purposes in Tarrant County, Texas (Ref. 9, pp. 37, 42). However, drinking water in the Fort Worth area is supplied by Eagle Mountain Lake, Lake Worth, Bridgeport Lake, Richland Chambers Lake and Cedar Creek Lake, all of which are surface water sources (Ref. 10).

The distance to the nearest drinking water well is not known. Fort Worth does not participate in the Wellhead Protection Program (Ref. 22).

5.2 SURFACE WATER

Fort Worth utilizes five drinking water intakes located at Eagle Mountain Lake, Lake Worth, Bridgeport Lake, Cedar Creek Lake and Richland Chambers Lake (Ref. 10). Eagle Mountain Lake, Lake Worth and Bridgeport Lake are located more than 15 miles northwest and upgradient from the site. Cedar Creek Lake and Richland Chambers Lake lie southwest more than 50 miles downgradient from the site (Ref. 19). There are no surface water intakes used for drinking water purposes within 15 stream miles of FRS (Ref. 19; Ref. 21). However, there is one surface water intake used for irrigation approximately 14 miles downstream from the site, which is used to irrigate 25 acres of farmland (Ref. 21).

The West Fork of the Trinity River is typically fished by local residents on a regular basis. Currently, there is a ban on fishing due to chlordane contamination (Ref. 17). The TWC classifies the West Fork as a contact recreational (CR) river. Contact recreational is defined as activities

involving a significant risk of ingesting including wading by children, swimming, water skiing, diving and surfing (Ref. 12, pp. 4 and 30). There are no documented sensitive environments or endangered species in the area of FRS (Ref. 18).

5.3 SOIL EXPOSURE

The estimated population living within a 1 mile radius of FRS is 960 (Ref. 2; Ref. 16). The nearest resident is approximately ½ mile northwest of the site (Ref. 2). There are no residents on the grounds of FRS (Ref. 2; Appendix A). There are 150 people working at Allied Electronics on Pebble Drive in Fort Worth (Ref. 22). Allied Electronics currently occupies the former FRS site. There are no known terrestrial sensitive environments or endangered species in the area (Ref. 18).

5.4 AIR

The number of residents within a 1, 2, 3 and 4 mile radius of FRS are 960, 9,090, 25,155 and 50,640, respectively (Ref. 2; Ref. 16). There are not any residents on the grounds of FRS (Ref. 2; Appendix A). There are 150 people currently working at Allied Electronics (current occupant of the former FRS site) (Ref. 22). During the FIT off-site reconnaissance inspection, land surrounding FRS was used for industrial purposes. There are no parks or farms within a 4 mile radius of FRS (Ref. 2). The nearest resident is approximately ½ mile northwest of the site (Ref. 2).

Schools in the area are Richland Junior High School, located 1¼ mile north; Glenview School, located 2 miles north; North Richland School, located 2¼ miles north; Heights School, located 3 miles north; South Birdville School and Birdville High School, approximately 1 mile west of West School, located 2½ miles northwest; North School, located 3¼ miles northeast; and Eastern Hills School, located 3 miles south of the site (Ref. 2).

There are no documented sensitive environments in the region (Ref. 18).

6. CONCLUSIONS

FRS began producing robots used for manufacturing lightweight products in July, 1982. On November 13, 1989, FRS filed for bankruptcy under Chapter 7. On September 8, 1987, FRS filed a Notification of Hazardous Waste Activity with the EPA, which stated that FRS generated less than 1,000 kg per month of hazardous waste. FRS registered with the TWC as a Small Quantity Generator on August 21, 1987. FRS filed an Industrial Solid Waste Management Inventory Initial Notification with the TWC on October 1, 1987. The notification stated that FRS was a small quantity generator that engaged in on-site waste handling and shipped two loads of waste off-site per year.

FRS operated an on-site waste management facility which contained liquid paint wastes, lacquer thinner, U159 (methyl ethyl ketone), and U165 (naphthalene). Other contaminants of concern include wastes U220 (toluene), U239 (dimethylbenzene), U154 (methyl alcohol), U002 (acetone), U057 (cyclohexanol), U161 (4-methyl-2-pentanone), U231 (2,4,6-trichlorophenol), D007 (chromium),

D008 (lead) and D001 (ignitable substances), F003 and F005. The wastes were generated during the process of painting automated equipment. Specific information concerning storage and disposal practices is not documented in available files.

Further investigation is needed to determine well usage near FRS. The West Fork of the Trinity River is regularly fished by the public. Currently there is a ban on fishing in the West Fork due to chlordane contamination. There is one surface water intake on the West Fork of the Trinity used for irrigation, located 14 miles down river from FRS. Areas of contamination were not seen by the FIT during the off-site reconnaissance inspection. Evidence supporting pathway contamination was not found by the FIT. There is no documentation regarding contaminant release into ground water, surface water, soil or air. There are no documented sensitive environments or endangered species in the area of FRS.

PA DOCUMENTATION LOG SHEET

SITE:	FARED ROBOT SYSTEMS
IDENTIFICATION NUMBER:	TXD987996782
CITY:	FORT WORTH
STATE:	TEXAS

REFERENCE NUMBER	DESCRIPTION OF THE REFERENCE
1	Potential Hazardous Waste Site Identification, EPA Form 2070-8. Prepared by Ecology and Environment for the EPA Region VI. April 19, 1990.
2	U.S.G.S. 7.5 Minute Series Topographic Map. Hurst, Texas, 1959. Photorevised 1981.
3	Geologic Atlas of Texas, Dallas Sheet. Prepared by the Army Corp of Engineers for the U.S.G.S. 1972.
4	Letter. Texas' Wellhead Protection (WHP) Program. From: David P. Terry, Ground Water Section, Texas Water Commission. To: Alex Zocchi, FIT Engineer, ICF Kaiser Engineers. July 15, 1991.
5	Record of Communication. Date Fared (Robot) Systems Began Operation. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Dallas Public Library, Business and Technology Section. November 20, 1990. TXD987996782.
6	Industrial Solid Waste Management Inventory, Initial Notification. Prepared by Fared (Robot) Systems for the Texas Water Commission. August 24, 1987.
7	Notice of Registration, Solid Waste Management. Prepared by the Texas Water Commission. October 13, 1987.
8	Taylor, Howard D. Water-Level and Water-Quality Data from Observation Wells in Northeast Texas (Report 198). Texas Water Development Board. February 1976.
9	Nordstrom, Phillip L. Occurrence, Availability, and Chemical Quality of Ground Water in the Cretaceous Aquifers of North-Central Texas. Volume 1 (Report 269). Texas Department of Water Resources. April 1982.

10 Record of Communication. Source of Drinking Water for Fort Worth, Texas. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Mike Jones, Engineer, Fort Worth Water Department. TXD987996782.

11 Soil Survey of Tarrant County, Texas. U.S. Department of Agriculture Soil Conservation Service in Cooperation with the Texas Agriculture Experiment Station. June 1981.

12 Texas Surface Water Quality Standards. Informational Copy. Texas Water Commission. December 1986.

13 Water Resources Data - Water Year 1989. U.S. Geological Survey Water Data Report TX-89-1. Prepared in Cooperation with the State of Texas and Other Agencies. Volume 1. 1989.

14 Federal Emergency Management Agency. Flood Insurance Rate Map. City of Fort Worth, Texas-Tarrant and Denton Counties. Panel 55 of 160. Map Revised on November 18, 1988.

15 Hershfield, David. Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours, and Return Periods from 1 to 100 Years. Technical Paper 40. U.S. Department of Agriculture. Soil Conservation Service, Washington D.C. May 1961.

16 Record of Communication. Population and Area of Fort Worth and Tarrant County, Texas. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Marsha Carpenter, Economic Development, Fort Worth Chamber of Commerce. November 26, 1990. TXD987996782.

17 Record of Communication. Fishing on the West Fork of the Trinity River. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Carol Rathers, Public Information Officer, Trinity River Authority. December 13, 1990. TXD987996782.

18 Record of Communication. Information Concerning Sensitive Environments in the Area of Fared (Robot) Systems. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Dorinda Sullivan, Natural Heritage Foundation. November 8, 1990. TXD987996782.

19 U.S.G.S. State of Texas Map. 1985

20 Letter. HRS Net Precipitation Values. From: Andrew M. Platt, Group Leader, MITRE Corporation. To: Lucy Sibold, U.S. Environmental Protection Agency. May 26, 1988. Attachments.

21 Record of Communication. Water Intakes Along the West Fork of the Trinity River. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Mark Evans, Water Rights Section, Texas Water Commission. July 18, 1991. TXD987996782.

22 Record of Communication. Number of Employees at Allied Electronics on Pebble Drive, Fort Worth, TX. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Receptionist, Allied Electronics. July 25, 1991. TXD987996782.

APPENDIX A

PHOTO-DOCUMENTATION

PHOTOGRAPH 1

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 1:52 p.m.	Direction:	Facing west

Comments: Drainage flows from parking lot over this cement slab into a pond on the southeast side of the site. Berm shown in background. Pipe shown in center of picture not associated with site drainage.

(This photograph matches negative number 1)

PHOTOGRAPH 2

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 1:54 p.m.	Direction:	Facing east

Comments: Drainage from parking lot to pond, southeast corner of site.

(This photograph matches negative number 2)

PHOTOGRAPH 3

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 1:59 p.m.	Direction:	Facing south

Comments: North side of building that used to be Fared (Robot) Systems, but is now Allied Electronics, Inc.

(This photograph matches negative number 3)

PHOTOGRAPH 4

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:02 p.m.	Direction:	Facing east

Comments: West side of Allied Electronics, Inc. with dumpsters and cars in parking lot

(This photograph matches negative number 5)

PHOTOGRAPH 5

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:04 p.m.	Direction:	Facing southeast

Comments: Southwest corner of building and cars in parking lot. Photo is facing in the general direction of parking lot drainage.

(This photograph matches negative number 6)

PHOTOGRAPH 6

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:10 p.m.	Direction:	Facing west

Comments: East-west berm on south side of site.

(This photograph matches negative number 7)

PHOTOGRAPH 7

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:12 p.m.	Direction:	Facing north

Comments: Drain pipes protruding from southeast corner of building. Note brown stains under pipes.

(This photograph matches negative number 8)

PHOTOGRAPH 8

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date:	10-8-90	Time: 2:14 p.m.	Direction: Facing northwest

Comments: East side of building and parking lot full of cars

(This photograph matches negative number 9)

PHOTOGRAPH 9

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:16 p.m.	Direction:	Facing northwest

Comments: Spillway where drainage from parking lot enters pond on southeast corner of site.

(This photograph matches negative number 10)

PHOTOGRAPH 10

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:19 p.m.	Direction:	Facing southeast

Comments: Oil sheen on edge of pond next to spillway, southeast corner of site.

(This photograph matches negative number 11)

ICF KAISER ENGINEERS | ICF KAISER ENGINEERS, INC.
1509 MAIN STREET, SUITE 900
DALLAS, TEXAS 75201-4809

PHOTO NEGATIVES
Fared (Robot) Systems
Fort Worth, Texas
TXD 987996782

PHOTOGRAPH 11

Site Name:	Fared (Robot) Systems	CERCLIS:	TXD987996782
Location:	Fort Worth, Texas	TDD Number:	F6-9008-6
Photographer:	Tom Ritchie	Witness:	Warren Mitchell
Date: 10-8-90	Time: 2:27 p.m.	Direction:	Facing south

Comments: North-south berm located 1/8 mile west of site.

(This photograph matches negative number 13)

REFERENCE 1

ref. 1

F06-9003-13

EPA POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION

REGION	SITE NUMBER
VI	

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME	B. STREET (or other identifier)		
FARED (Robot) Systems	7410 Pebble Drive (Box 185579)		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Fort Worth	TX	76181-5579	Tarrant

G. OWNER/OPERATOR (If known)

1. NAME	2. TELEPHONE NUMBER
Harold Spidle (President) (Reference 1)	(817)284-3401

H. TYPE OF OWNERSHIP (If known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

The site is located on 95,000 square feet of office and manufacturing space. It was used to manufacture robot systems for assembling lightweight products. Most of the components used were "off the shelf," but some were manufactured at the site (2). On November 13, 1989 the company filed for bankruptcy under Chapter 7 (4).

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)	K. DATE IDENTIFIED (mo., day, & yr.)
Through bankruptcy notification	11-13-89

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

The company filed a Notification of Hazardous Waste Activity with the EPA on September 8, 1987 (3). The notification lists waste activity at less than 1,000 kg/month for the following compounds and elements:

unsp

~~2-butanone~~ methyl, ethyl, ketone
cyclohexane
toluene
4-methyl-2-pentanone
xylene
2,4,6-trichlorophenol
methanol
acetone
naphthalene
chromium
lead

The company's waste disposal practices are unknown.

M. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Greg Straughn, FIT Chemist	(214) 742-6601	4/19/90

EPA Form 2070-8 (5-80)

Reference 3

EPA

ACKNOWLEDGEMENT OF NOTIFICATION OF HAZARDOUS WASTE ACTIVITY
(VERIFICATION)

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER → TXD028627438

FARED ROBOT SYSTEMS
YARBROUGH, DAVID MGR
PO BOX 185579
FORT WORTH TX 76181

INSTALLATION ADDRESS →

7410 PEBBLE DR
FORT WORTH 76181

EPA Form 8700-12B (4-80)

IV. Installation Contact

Name and Title *(last, first, and job title)*	Phone Number *(area code and number)*
YARBROUGH DAVID MGR	8172843401

V. Ownership

A. Name of Installation's Legal Owner	B. Type of Ownership *(enter code)*
CORPORATION / NEWELL NEWELL (Property Owners)	P

VI. Type of Regulated Waste Activity *(Mark 'X' in the appropriate boxes. Refer to instructions.)*

A. Hazardous Waste Activity	B. Used Oil Fuel Activities
☐ 1a. Generator ☒ 1b. Less than 1,000 kg/mo. SQG C 1101=3	☐ 6. Off-Specification Used Oil Fuel *(enter 'X' and mark appropriate boxes below)*
☐ 2. Transporter	☐ a. Generator Marketing to Burner
☐ 3. Treater/Storer/Disposer	☐ b. Other Marketer
☐ 4. Underground Injection	☐ c. Burner
☐ 5. Market or Burn Hazardous Waste Fuel *(enter 'X' and mark appropriate boxes below)*	☐ 7. Specification Used Oil Fuel Marketer *(or On site Burner)* Who First Claims the Oil Meets the Specification
☐ a. Generator Marketing to Burner	
☐ b. Other Marketer	
☐ c. Burner	

SEP 08 1987
HAZARDOUS WASTE PROGRAMS BRANCH

VII. Waste Fuel Burning: Type of Combustion Device *(enter 'X' in all appropriate boxes to indicate type of combustion device(s) in which hazardous waste fuel or off-specification used oil fuel is burned. See instructions for definitions of combustion devices.)*

☐ A. Utility Boiler ☐ B. Industrial Boiler ☐ C. Industrial Furnace

VIII. Mode of Transportation *(transporters only — enter 'X' in the appropriate box(es))*

☐ A. Air ☐ B. Rail ☐ C. Highway ☐ D. Water ☐ E. Other *(specify)*

IX. First or Subsequent Notification

Mark 'X' in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your installation's EPA ID Number in the space provided below.

☒ A. First Notification ☐ B. Subsequent Notification *(complete item C)*

C. Installation's EPA ID Number

3

,87 DA 9-15-87

Please print or type with ELITE type *(12 characters per inch)* in the unshaded areas only

Form Approved. OMB No. 2050-0028. Expires 9-30-88
GSA No. 0246-EPA-OT

United States Environmental Protection Agency
Washington, DC 20460

38093

EPA Notification of Hazardous Waste Activity

Please refer to the *Instructions for Filing Notification* before completing this form. The information requested here is required by law *(Section 3010 of the Resource Conservation and Recovery Act)*.

For Official Use Only

Comments

C C

817 5728

Installation's EPA ID Number

C F TXD028627438 T/A C 1

Approved

Date Received (yr. mo. day)

439/Tarrant

I. Name of Installation

FARED ROBOT SYSTEMS

II. Installation Mailing Address

Street or P.O. Box

C 3 PO BOX 185579

City or Town | State | ZIP Code

C 4 FORT WORTH | TX | 76181

III. Location of Installation

Street or Route Number

C 5 7410 PEBBLE DR ~~AVE~~

City or Town | State | ZIP Code

C 6 FORT WORTH | TX | 76181

IV. Installation Contact

Name and Title *(last, first, and job title)* | Phone Number *(area code and number)*

C 2 YARBROUGH DAVID MGR | 817 284 3401

V. Ownership

A. Name of Installation's Legal Owner | B. Type of Ownership *(enter code)*

C R CORPORATION/NEWELL NEWELL (Property Owners) | P

VI. Type of Regulated Waste Activity *(Mark 'X' in the appropriate boxes. Refer to instructions.)*

A. Hazardous Waste Activity

- ☐ 1a. Generator
- ☒ 1b. Less than 1,000 kg/mo. SQG
- ☐ 2. Transporter
- ☐ 3. Treater/Storer/Disposer
- ☐ 4. Underground Injection
- ☐ 5. Market or Burn Hazardous Waste Fuel *(enter 'X' and mark appropriate boxes below)*
  - ☐ a. Generator Marketing to Burner
  - ☐ b. Other Marketer
  - ☐ c. Burner

C 1101=3

B. Used Oil Fuel Activities

- ☐ 6. Off-Specification Used Oil Fuel *(enter 'X' and mark appropriate boxes below)*
  - ☐ a. Generator Marketing to Burner
  - ☐ b. Other Marketer
  - ☐ c. Burner
- ☐ 7. Specification Used Oil Fuel Marketer *(or On site Burner)* Who First Claims the Oil Meets the Specification

SEP 08 1987 HAZARDOUS WASTE PROGRAMS BRANCH

VII. Waste Fuel Burning: Type of Combustion Device *(enter 'X' in all appropriate boxes to indicate type of combustion device(s) in which hazardous waste fuel or off-specification used oil fuel is burned. See instructions for definitions of combustion devices.)*

☐ A. Utility Boiler ☐ B. Industrial Boiler ☐ C. Industrial Furnace

VIII. Mode of Transportation *(transporters only — enter 'X' in the appropriate box(es)*

☐ A. Air ☐ B. Rail ☐ C. Highway ☐ D. Water ☐ E. Other *(specify)*

IX. First or Subsequent Notification

Mark 'X' in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your installation's EPA ID Number in the space provided below.

☒ A. First Notification ☐ B. Subsequent Notification *(complete item C)*

C. Installation's EPA ID Number

4

For Official Use Only																										T/A	C
C																											
W																											1

X. Description of Hazardous Wastes *(continued from front)*

A. Hazardous Wastes from Nonspecific Sources. Enter the four-digit number from 40 *CFR* Part 261.31 for each listed hazardous waste from nonspecific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
F003	F005				
7	**8**	**9**	**10**	**11**	**12**

B. Hazardous Wastes from Specific Sources. Enter the four-digit number from 40 *CFR* Part 261.32 for each listed hazardous waste from specific sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**

C. Commercial Chemical Product Hazardous Wastes. Enter the four-digit number from 40 *CFR* Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
U159	U220	U239	U154	U002	U165
37	**38**	**39**	**40**	**41**	**42**
U057	U161	U231	D007	D008	
43	**44**	**45**	**46**	**47**	**48**

D. Listed Infectious Wastes. Enter the four-digit number from 40 *CFR* Part 261.34 for each hazardous waste from hospitals, veterinary hospitals, or medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. Characteristics of Nonlisted Hazardous Wastes. Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 — 261.24)*

- ☒ 1. Ignitable *(D001)*
- ☐ 2. Corrosive *(D002)*
- ☐ 3. Reactive *(D003)*
- ☐ 4. Toxic *(D000)*

XI. Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature	Name and Official Title *(type or print)*	Date Signed
	David Yarbrough	8-5-87

EPA Form 8700-12 (Rev. 11-85) Reverse

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Mr. Mark Maldino Fort Worth Federal Courthouse (817) 334-3802	From: Greg Straughn GKS FIT Chemist	Date: 4/18/90 Time: 15:48

SUBJECT: Chapter 7 filing of FARED Systems, Inc.

SUMMARY OF COMMUNICATION

Mr. Mark Maldino stated that FARED Systems filed for Chapter 7 on November 13, 1989. The case number is 489-43849-7.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

REFERENCE 2

Ref 2

ADAPTED FROM

HURST, TEX.

[illegible] QUADRANGLE [illegible] QUADRANGLE

N3245—W9707.5/7.5

1959

PHOTOREVISED 1981

DMA 6549 I SW—SERIES V882

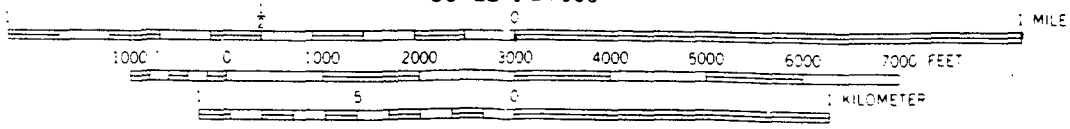
ROAD CLASSIFICATION

Heavy-duty ——— Light-duty [illegible]

Medium-duty ——— Unimproved dirt [illegible]

[illegible] State Route

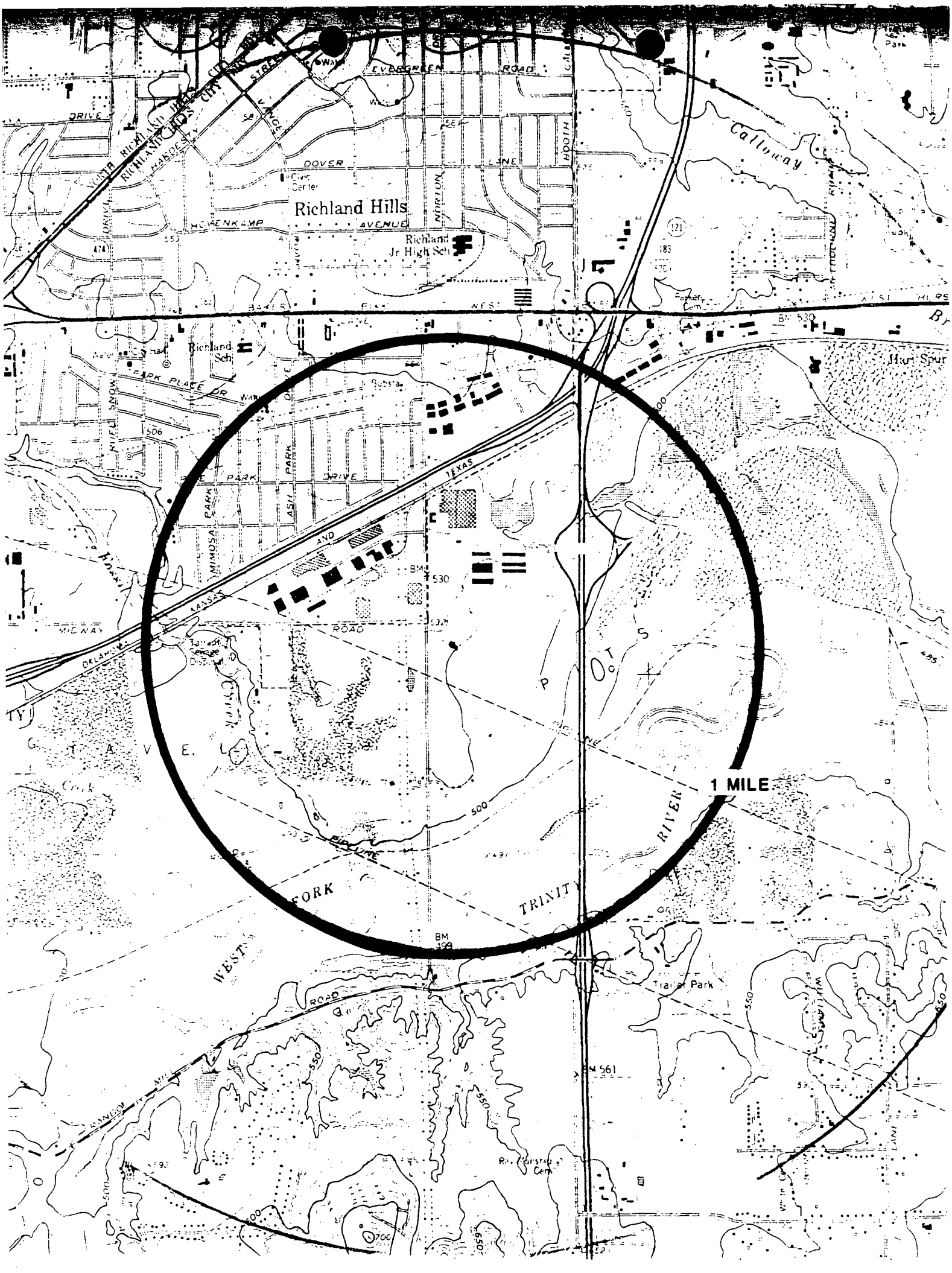
SCALE 1:24000



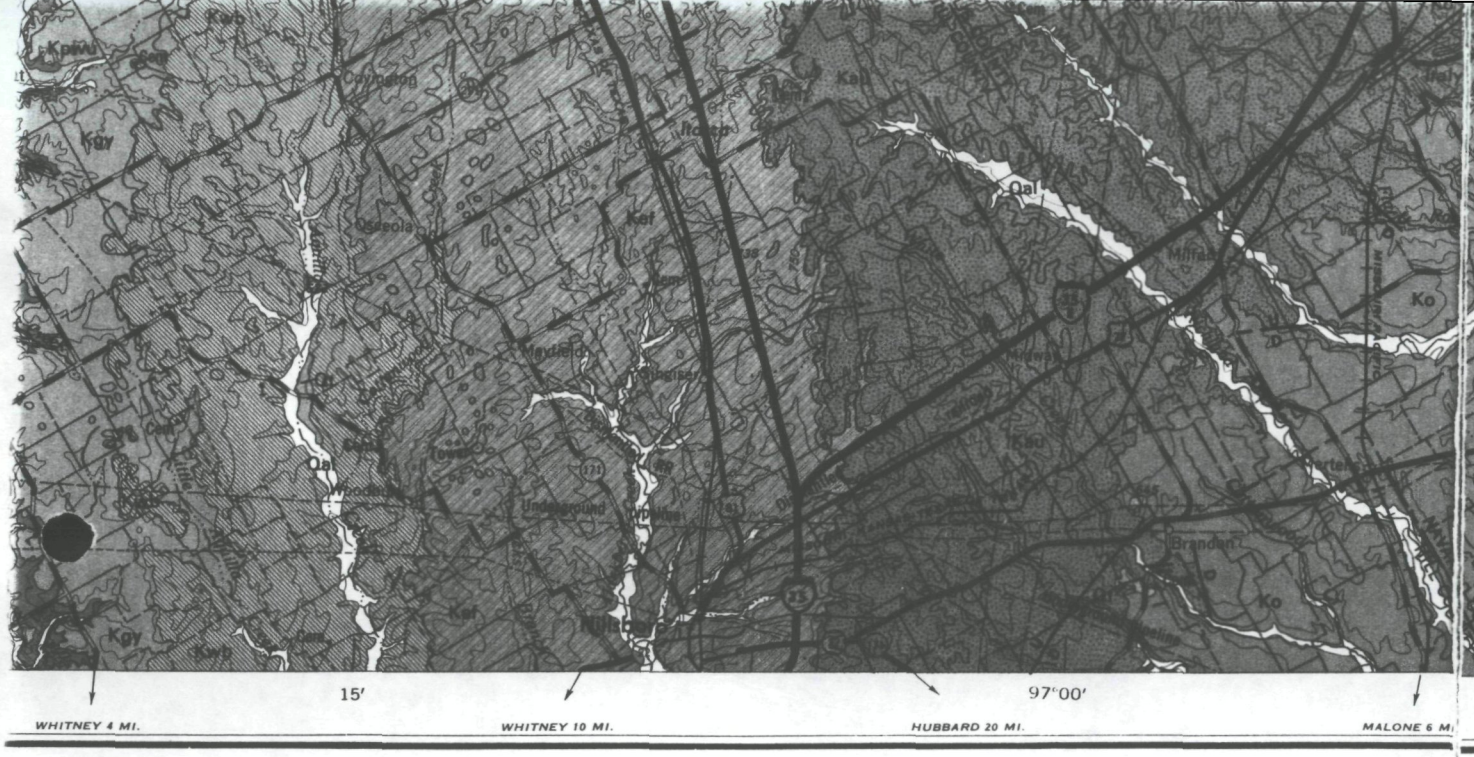
CONTOUR INTERVAL 10 FEET

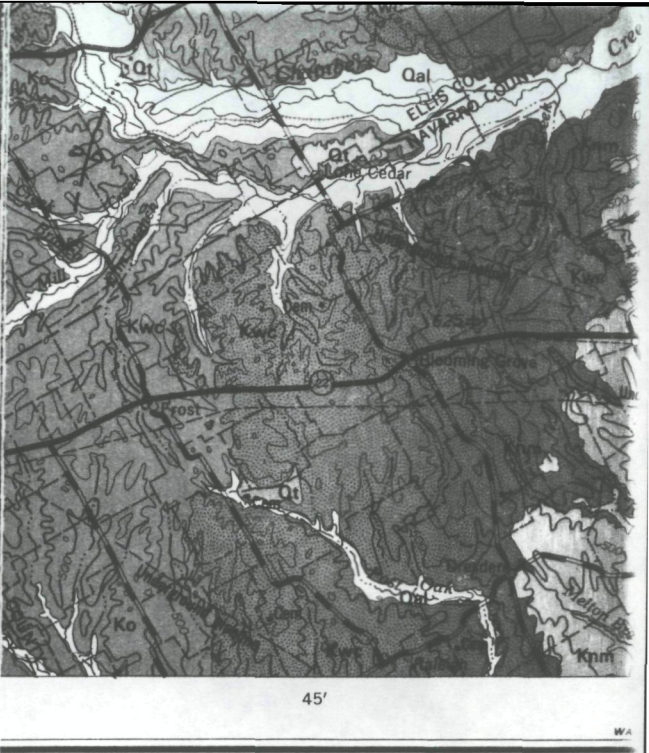
DOTTED LINES REPPESENT 5 FOOT CONTOURS

NATIONAL GEODETIC VERTICAL DATUM OF 1929


Richland Hills
1 MILE

REFERENCE 3





Scale 1:250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

5 0 5 10 Nautical Miles

CONTOUR INTERVAL 50 FEET

TRANSVERSE MERCATOR PROJECTION

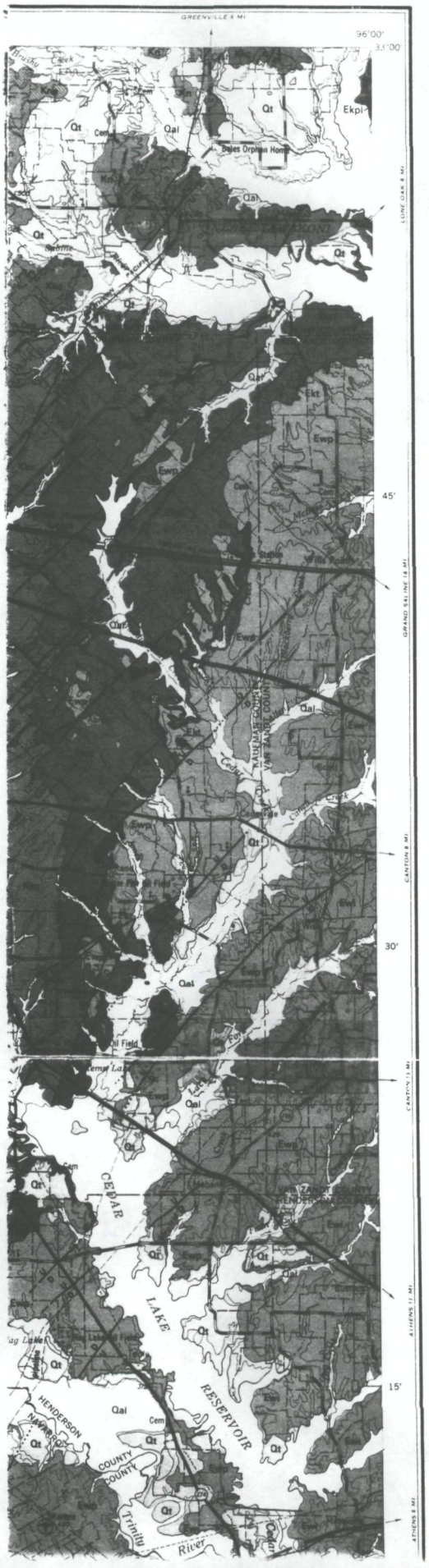
1955 MAGNETIC DECLINATION FOR THIS SHEET VARIES FROM 9°45′ EASTERLY FOR THE CENTER OF THE WEST EDGE TO 8°45′ EASTERLY FOR THE CENTER OF THE EAST EDGE. MEAN ANNUAL CHANGE IS 0°02′ WESTERLY.

GEOLOGIC ATLAS OF TEXAS, DALLAS SHEET

GAYLE SCOTT MEMORIAL EDITION

1972

GEOLOGIC ATLAS OF TEXAS
DALLAS SHEET



EXPLANATION

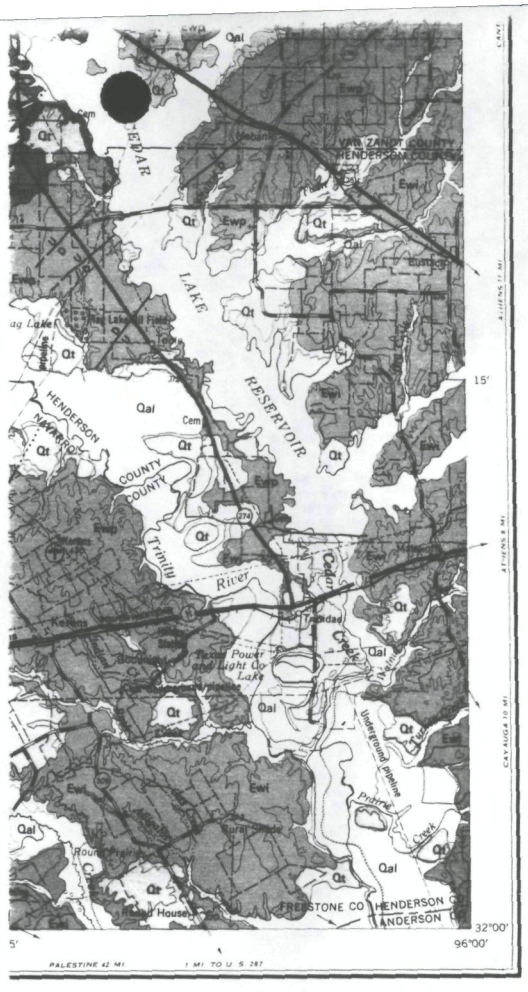
Formations Described in Separate Text

		Qal	Alluvium
Pleistocene	Recent	Qt	Fluviatile terrace deposits
		Ewl	Wilcox Group undivided
Eocene		Ewp	Midway Group
		Kkc	Kemp Clay and Corsicana Marl undivided
		Kn	Nacatoch Sand
Upper Cretaceous		Knm / Kne / Kmb	Neylandville Formation and Marlbrook Marl
			Pecan Gap Chalk ?
		Kwc	Wolfe City Formation
		Ko	Ozan Formation ("lower Taylor marl")
		Kau	Austin Chalk
		Kef	Eagle Ford Group undivided
		Kwb	Woodbine Formation
		Kgy	Grayson Marl and Main Street Limestone undivided
		Kpwu / Kgwd / Kaw / Kdc / Kfw	Pawpaw Formation, Weno Limestone, Denton Clay, Fort Worth Limestone, and Duck Creek Formation
			Kiamichi Formation
Lower Cretaceous		Kef / Kdw	Edwards Limestone, Comanche Peak Limestone, and Goodland Limestone
		Kuw	Walnut Formation
		Kpa	Paluxy Formation
			Glen Rose Formation
		Ktm	Twin Mountains Formation
ssouri Series		ss2 / Pmw / Pls	

QUATERNARY

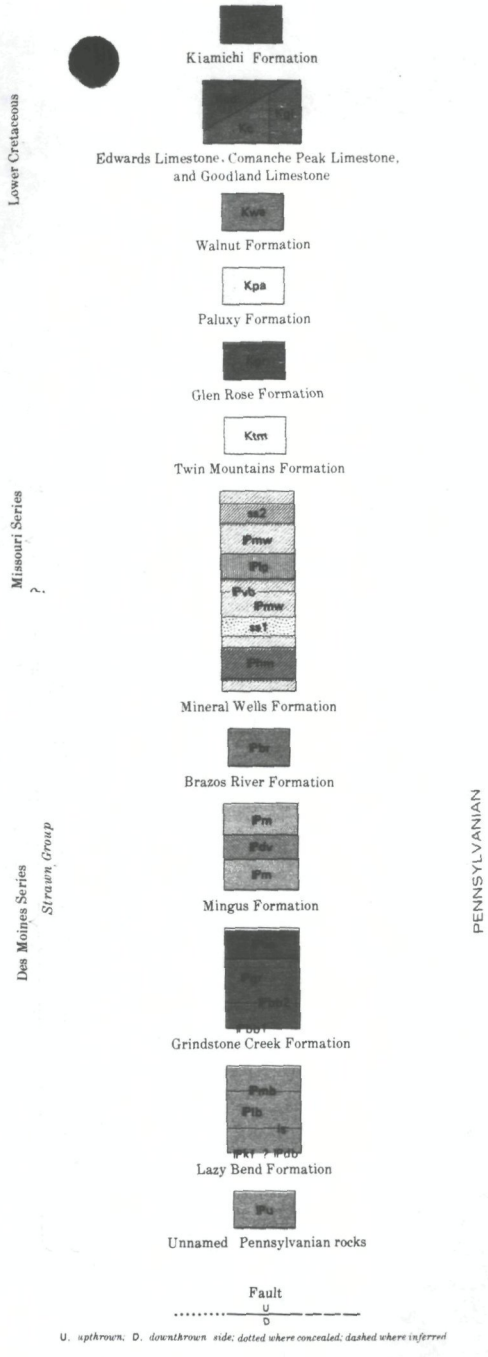
TERTIARY

CRETACEOUS

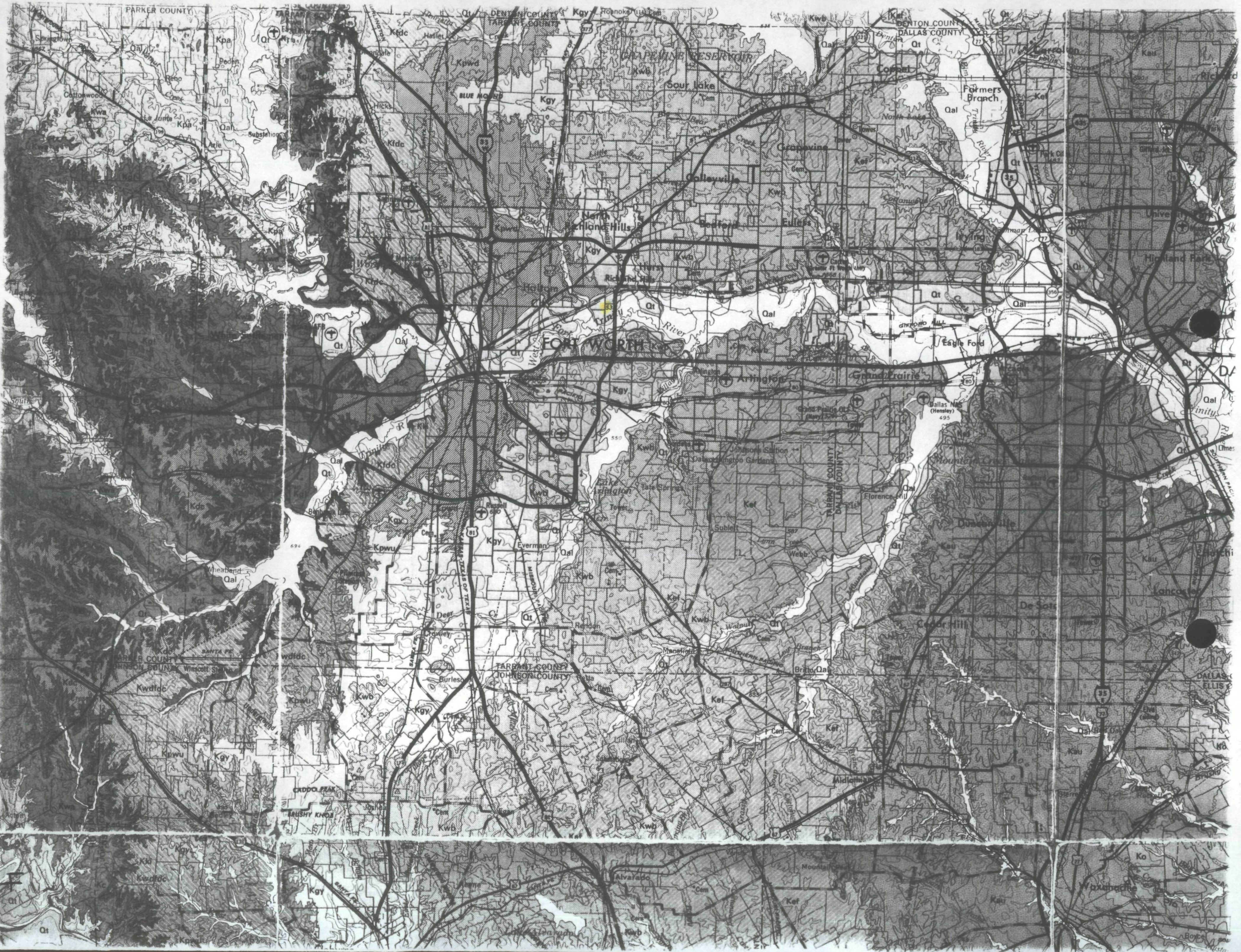


INDEX OF GEOLOGIC MAPPING

Numbers in outlined areas refer to items in bibliography in "Index to Areal Geologic Maps in Texas, 1891-1961," by T. E. Brown (1963), Bureau of Economic Geology, The University of Texas at Austin. For area A, see O. D. Weaver, J. A. Rogers, W. F. Buckthal, A. E. Kurie, E. R. Leggat, Dan McGill, and Ray Rall, Geologic map of central Tarrant County, Fort Worth Geological Society; for area B, see C. F. Dodge, Geologic map of the eastern half of Tarrant County, Texas (manuscript map, 1966); for area C, see G. H. Norton (1965), Geologic map of Dallas County, Dallas Geological Society.



U. upthrown, D. downthrown side; dotted where concealed; dashed where inferred


PARKER COUNTY
DENTON COUNTY
TARRANT COUNTY
DALLAS COUNTY
GRAPEVINE RESERVOIR
BLUE MOUND
Sour Lake
Coppell
Farmers Branch
North Lake
Grapevine
Colleyville
North Richland Hills
Bedford
Euless
Irving
Hurst
Richland Hills
Highland Park
FORT WORTH
Trinity River
Eagle Ford
Arlington
Grand Prairie
Dallas NAS (Hensley)
Johnson Station
Lake Arlington
Mountain Creek
Florence Hill
Sublett
Everman
Webb
Duncanville
Wheatland
Kwb
Lancaster
De Soto
Crowley
Rendon
Cedar Hill
Mansfield
Britton
TARRANT COUNTY
JOHNSON COUNTY
PARKER COUNTY
JOHNSON COUNTY
Burleson
Lillian
Midlothian
CADDO PEAK
BUSHY KNOB
Alvarado
Waxahachie
Qal
Qt
Kgy
Kef
Kpa
Kwb
Kdc
Kau

TEXAS WATER DEVELOPMENT BOARD

REPORT 198

WATER-LEVEL AND WATER-QUALITY DATA FROM OBSERVATION WELLS IN NORTHEAST TEXAS

By

Howard D. Taylor, Geologist

and

Staff of the Water Levels

and Ground Water Quality Monitoring Sections

February 1976

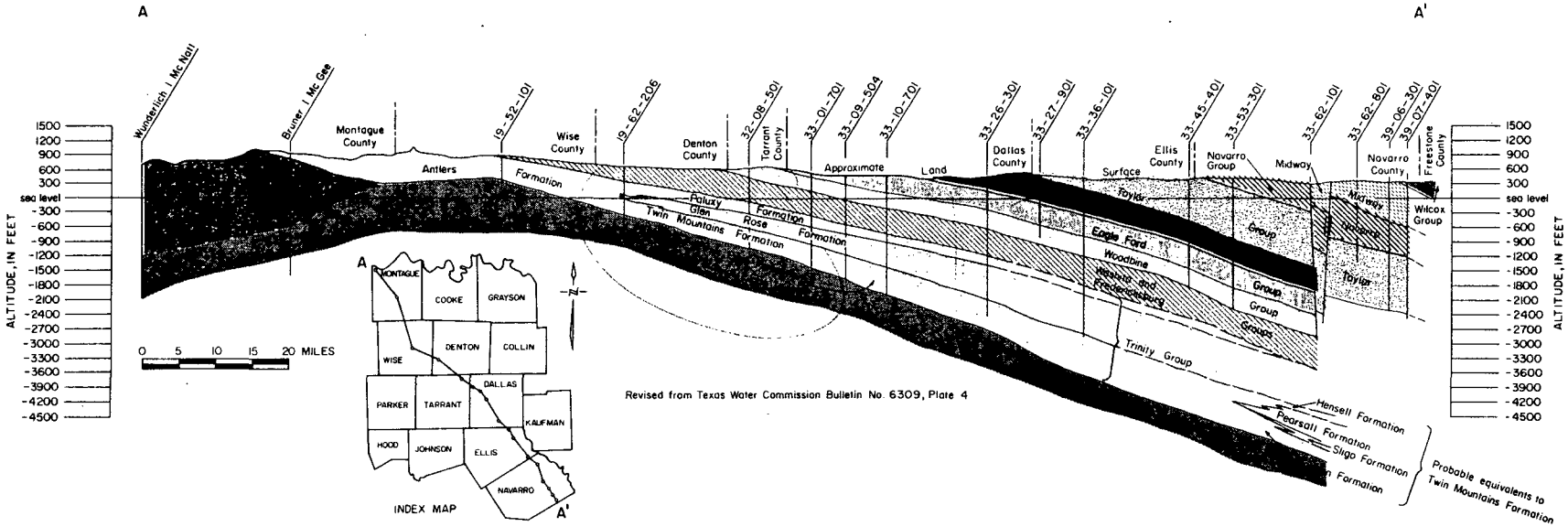
TEXAS WATER DEVELOPMENT BOARD

Published and distributed
by the
Texas Water Development Board
Post Office Box 13087
Austin, Texas 78711

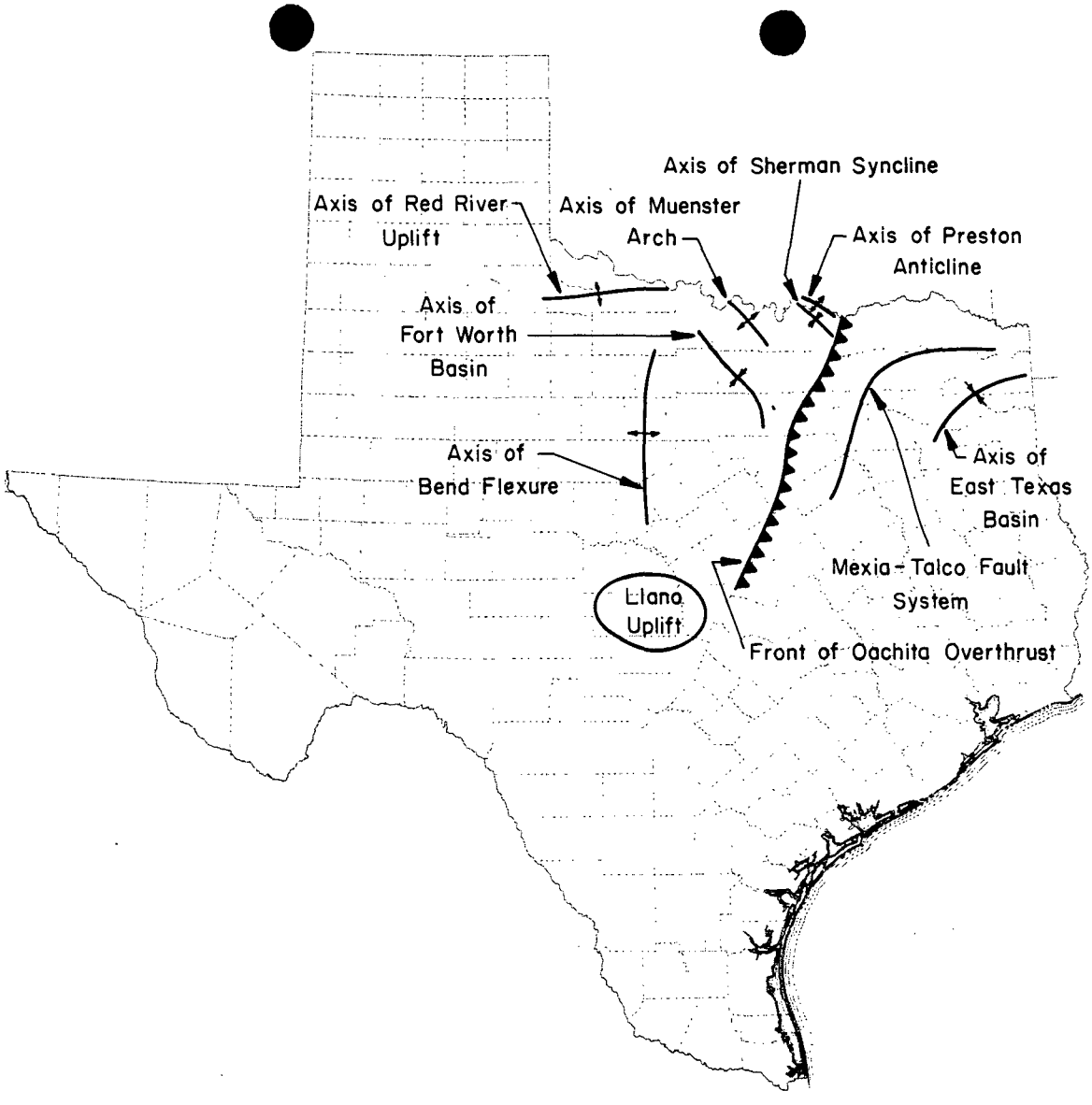
TABLE OF CONTENTS

DATA, BY COUNTIES
(Number Indicates Page)

TABLE OF CONTENTS (Cont'd.)



Generalized Geologic Cross Section
A-A' Montague to Navarro Counties

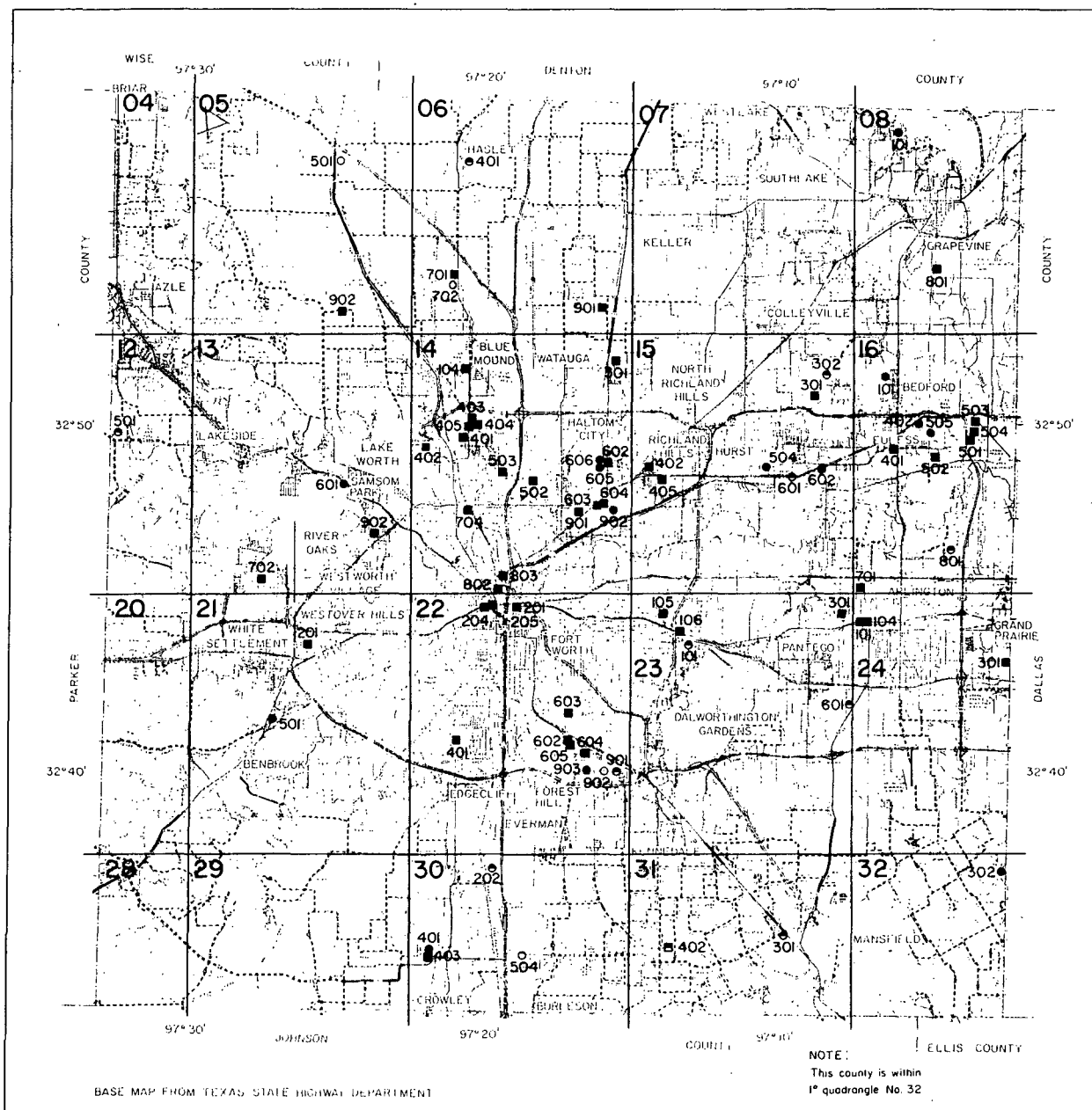


Major Structural Features From the Llano Uplift North and Northeastward to the Red River

west to nearly 7,500 feet in the southeast. Regional dip is east and southeast at rates of about 15 to 40 feet per mile. The dip rate increases to as much as 300 feet per mile on the flank of a southeastward-plunging ridge called the Preston anticline. This anticline and an associated trough immediately to the south called the Sherman syncline have caused deflection in the regional outcrop pattern as shown on the geologic map.

Tertiary System beds dip regionally southeastward from the Mexia-Talco fault system, which extends in a northerly direction along the eastern margin of the report area, at a rate of about 100 feet per mile. Deviations from this dip rate occur locally due to faulting. These beds attain a thickness in excess of 1,000 feet in Navarro County.

Quaternary deposits occur along the floodplains of the Brazos, Red, Sulphur, and Trinity Rivers and many of their main tributaries. Terraces, which represent remnants of older floodplain deposits of these drainage systems, occur at higher elevations along some of the rivers, particularly the Red River. Alluvial deposits are reported to be as thick as 60 feet in Grayson County. Generally, the alluvial deposits are irregular in thickness and areal extent. Regional slope of these deposits is probably less than 5 feet per mile and generally east and southeast in the direction of the slope of the land surface. Locally, the direction will vary according to the direction of stream or river flow. The following map shows many of the major structural features in and near the report area.



BASE MAP FROM TEXAS STATE HIGHWAY DEPARTMENT

NOTE:
This county is within 1° quadrangle No. 32

EXPLANATION

CURRENT OBSERVATION WELLS	HISTORICAL OBSERVATION WELLS
● 101 Water level	■ 104 Water level
○ 501 Water quality	▣ 402 Water level and water quality
◒ 302 Water level and water quality	

N

0 1 2 3 4 MILES

Location of Observation Wells in Tarrant County

WATER LEVEL MEASUREMENTS, IN FEET, BELOW LAND SURFACE - CONTINUED
• DENOTES WELL PUMPED RECENTLY OR NEARBY WELL PUMPING
Q MEASUREMENT QUESTIONED DUE TO BORE HOLE OR WELL ENTRY CONDITIONS

STATE WELL NUMBER	AQUIFER CODE	DEPTH OF WELL	ELEVATION OF LAND SURFACE	DATE	MEASUREMENT	CHANGE IN WATER LEVEL FROM PREVIOUS MEASUREMENT	
						DECLINE	RISE
				08-31-54	486.15	69.19	
*32-14-605	KCTM	1272	595.00	10-----58	653.10		
				07-----59	640.00		13.10
				01-----60	639.00		1.00
				01-15-71	800.00	161.00	
				11-10-71	800.00		
				11-17-72	830.00	30.00	
				11-09-73	790.00		40.00
				11-12-74	788.00		2.00
32-14-606	KCPA	540	595.00	04-11-59	375.90		
				07-18-63	429.00	53.10	
				11-10-71	409.00		20.00
				11-17-72	419.00	10.00	
				11-09-73	419.00		
				11-12-74	407.00		12.00
32-14-704	KCTM	710	560.00	------02	232.00		
				07-29-48	453.54	221.54	
				07-22-49	455.25	1.71	
				12-29-49	447.95		7.30
				02-27-50	447.09		0.86
				04-10-50	427.49		19.60
				05-25-50	443.30	15.81	
				02-12-54	464.70	21.40	
				02-24-54	468.25	3.55	
32-14-802	KCTM	1000	605.00	04-15-42	323.60		
				06-14-44	361.10	37.50	
				07-22-49	419.95	58.85	
				12-22-49	399.49		20.46
				07-21-50	415.61	16.12	
				12-29-50	415.40		0.21
				06-01-51	429.98	14.58	
				10-05-52	438.72	8.74	
				01-27-53	444.86	6.14	
				03-31-53	445.34	0.48	
				04-28-53	446.55	1.21	
				06-30-53	464.25	17.70	
				09-14-53	470.05	5.80	
				11-17-53	465.05		5.00
				12-10-53	464.99		0.06
				01-27-54	457.80		7.19
				02-18-54	456.64		1.16
				03-22-54	458.12	1.48	

WATER LEVEL MEASUREMENTS, IN FEET, BELOW LAND SURFACE - CONTINUED
* DENOTES WELL PUMPED RECENTLY OR NEARBY WELL PUMPING
@ MEASUREMENT QUESTIONED DUE TO BORE HOLE OR WELL ENTRY CONDITIONS

STATE WELL NUMBER	AQUIFER CODE	DEPTH OF WELL	ELEVATION OF LAND SURFACE	DATE	MEASUREMENT	CHANGE IN WATER LEVEL FROM PREVIOUS MEASUREMENT DECLINE	RISE
				05-03-54	465.55	7.43	
				06-24-54	472.94	7.39	
				07-21-54	477.66	4.72	
				08-20-54	488.03	10.37	
				09-14-54	490.17	2.14	
				10-29-54	490.74	0.57	
				12-12-54	482.98		7.76
				02-02-55	480.67		2.31
				04-21-55	480.20		0.47
				02-21-56	490.30	10.10	
				06-20-56	503.40	13.10	
				02-07-57	524.70	21.30	
32-14-803	KCTM	800	595.00	10-12-50	405.35		
				12-29-50	405.90	0.55	
				03-14-51	408.90	3.00	
				06-02-51	408.91	0.01	
				03-31-53	436.52	27.61	
				04-27-53	438.14	1.62	
				06-30-53	451.95	13.81	
32-14-901	KCTM	1160	560.00	05-13-50	480.00		
				09-12-54	551.00	71.00	
				11-01-54	536.30		14.70
				12-09-54	518.60		17.70
				01-07-55	509.80		8.80
				03-23-55	505.70		4.10
32-14-902	KCPA	441	510.00	01-22-55	232.00		
				07-23-57	284.00	52.00	
				10-29-58	320.00	36.00	
				02-13-70	340.00	20.00	
				11-10-71	352.00	12.00	
				11-17-72	347.00		5.00
				11-09-73	362.00	15.00	
				11-12-74	339.00		23.00
32-15-301	KCTM	1657	610.00	09-17-54	479.50		
				11-10-71	786.00@	306.50	
32-15-302	KGW	50	620.00	11-18-70	33.83		
				11-01-71	35.18	1.35	
				11-13-72	34.75		0.43
				11-13-73	37.30	2.55	
				11-14-74	34.63		2.67

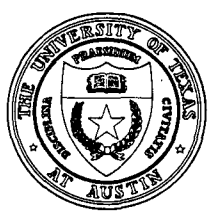
THE UNIVERSITY OF TEXAS AT AUSTIN
BUREAU OF ECONOMIC GEOLOGY

GEOLOGIC ATLAS OF TEXAS,

DALLAS SHEET

GAYLE SCOTT MEMORIAL EDITION

VIRGIL E. BARNES, Project Director



1972

EXPLANATION

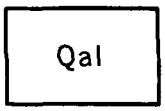
Recent

Pleistocene

Eocene

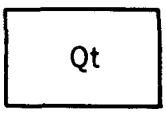
QUATERNARY

TERTIARY



Alluvium

Flood-plain deposits including indistinct low terrace deposits; gravel, sand, silt, silty clay, and organic matter

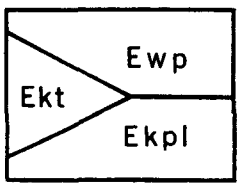


Fluviatile terrace deposits

Gravel, sand, silt, and clay; contiguous terraces of different ages separated by solid line

Wilcox Group undivided

Mostly mudstone with various amounts of sandstone, lignite, ironstone concretions, locally glauconitic in uppermost and lowermost parts. Mudstone, massive to thin bedded, interbedded with laminae of silt and very fine sand, pale brown to yellowish brown in upper part, medium to dark gray in lower part, weathers yellowish brown. Sandstone, medium to fine grained, moderately well sorted, cross-bedded, lenticular in upper part, units a few inches to 30 feet thick in lower part, light gray to pale yellowish brown and yellowish brown to moderate brown. Lignite mostly near middle of formation, seams 1 to 20 feet thick, brownish black. Abundant plant fossils, a few marine megafossils. Thickness 1,000 to 1,500 feet



Midway Group

Includes Wills Point Formation, Ewp, *Tehuacana Member of Kincaid Formation,* Ekt, *and Pisgah and Littig Members of Kincaid Formation undivided,* Ekpl

Wills Point Formation, Ewp, *clay, silty, sandy, silt and sand more abundant upward, slightly glauconitic near base, 10-inch rosette limestone bed below middle, massive, poorly bedded, grades upward to mudstone and sand of Wilcox Group, light gray to dark gray; weathers medium gray to yellowish gray, topographically featureless; thickness 550± feet*

Tehuacana Member of Kincaid Formation, Ekt, *limestone, silty, slightly glauconitic, hard, white to light gray, interbedded with light gray marl, thickness up to 30 feet, outcrop discontinuous, absent south of Trinity River*

Pisgah and Littig Members of Kincaid Formation undivided, Ekpl, *sand and clay. Sand, glauconitic, argillaceous, poorly sorted, medium gray to greenish gray, some hard sandstone beds near top; clay, sandy, silty, phosphatic pebbles and nodules present in lower part, medium gray to dark gray; weathers to yellow and yellowish brown soil. Thickness 150± feet*

Upper Cretaceous

CRETACEOUS

Kkc

Kemp Clay and Corsicana Marl undivided

Mostly clay, calcareous, locally silty, compact, thinly laminated, subconchoidal fracture, medium dark gray; weathers light gray and fissile; some interbeds of fine-grained sandstone near base; marine megafossils; thickness 300–400 feet

Kn

Nacatoch Sand

Quartz sand, fine grained, poorly sorted, friable, silty, glauconitic, local lenses of silty clay, compact, light gray to greenish gray; thin calcareous sandstone beds in upper and lower parts; marine megafossils; thickness 250± feet

Knm | Kne / Kmb

Neylandville Formation and Marlbrook Marl

Neylandville Formation and Marlbrook Marl undivided, Knm, *south of Rockwall County; where subdivided includes from top down* Neylandville Formation, Kne, *and* Marlbrook Marl, Kmb

Neylandville Formation, Kne, *clay, calcareous, silty, sandy, sand content increases upward, medium gray; weathers light gray, forms irregular topography; thickness 125± feet.*

Marlbrook Marl ("upper Taylor marl"), Kmb, *clay, calcareous, variable amount of silt and glauconite, silt content increases upward, disseminated pyrite, locally phosphate nodules and phosphatized marine megafossils, blocky, conchoidal fracture, light to dark gray; weathers light gray with poor fissility; marine megafossils; thickness 350± feet*

Kpg

Pecan Gap Chalk (?)

Marl and clay, very sandy and silty, medium gray; thickness up to 40 feet, feathers out southward northeast of Rockwall

Kwc

Wolfe City Formation

Marl, sand, sandstone, and mudstone. In Navarro County, marl, sandy and silty, interbedded with thin sandstone beds and massice sandstone; medium gray. Grades northward into an upper fine-grained sand and silt unit, calcareous, medium yellowish gray; and a lower mudstone unit, calcareous, dark gray, weathers medium gray. Marine megafossils. Thickness 75–300 feet, thins northward

Upper Cretaceous

Lower Cretaceous

CRETACEOUS

Ko

Ozan Formation ("lower Taylor marl")

Clay, calcareous, silt and sand content increases upward, montmorillonitic, blocky, conchoidal fracture, medium gray; some glauconite, phosphate pellets, hematite nodules, and pyrite nodules; some very thin limestone lenses locally in lower part; weathers light brownish gray with poor fissility, grades upward to Wolfe City Formation; marine megafossils; thickness 500± feet

Kau

Austin Chalk

Upper and lower parts, chalk, mostly microgranular calcite, massive, some interbeds and partings of calcareous clay, thin bentonitic beds locally in lower part, lower part forms westward-facing scarp; light gray. Middle part, mostly thin-bedded marl with interbeds of massive chalk, locally burrowed, marcasite-pyrite nodules common, light gray. Weathers white, marine megafossils scarce, thickness 300–500 feet, thins southward

Kef

Eagle Ford Group undivided

North of Hill County, shale, sandstone, and limestone; shale, bituminous, selenitic, with calcareous concretions and large septaria; sandstone and sandy limestone in upper and middle parts, platy, burrowed, medium to dark gray; in lower part bentonitic; hard limestone bed marks base in Ellis and Johnson counties; locally forms low cuesta; thickness 200–300 feet

Kwb

Woodbine Formation

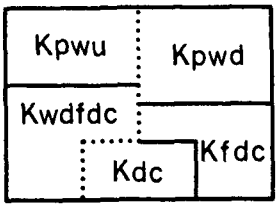
Sandstone, some clay and shale. Upper part, mostly sandstone, fine grained, well sorted, in part tuffaceous, ripple marked, large scale cross-bedding, reddish brown; near top some sandstone with large discoid concretions, medium to coarse grained, friable; some shale, jarositic, gray, fissile; some marine megafossils, oyster reefs locally. Middle part, mostly sandstone, fine grained, cross-bedded; some interbeds of clay, carbonaceous, in part sandy, gray to brown. Lower part, interbedded sandstone and clay; sandstone, fine grained, very thinly bedded to massive, some beds of ironstone and ironstone conglomerate, white, red, brown; clay, sandy, gray to brown; channeled locally. Thickness 175–250 feet, thickens northward

Kgy

Grayson Marl and Main Street Limestone undivided

Mostly Grayson Marl, *mostly calcareous clay and marl, blocky, yellowish gray and medium gray; some 0.25–1.0-foot limestone beds in upper one-third, very fine grained, fossiliferous; weathers yellowish brown, forms gentle slope; thickness 60–100 feet, thins northward*

Main Street Limestone, *medium grained, chalky, some 6–8-foot units of calcareous shale, thin bedded to massive, distinctly bedded to wavy bedded and nodular, yellowish gray; weathers light gray to white; thickness 20–35 feet, thins northward*



Pawpaw Formation, Weno Limestone, Denton Clay, Fort Worth Limestone, and Duck Creek Formation

Pawpaw Formation and upper limestone unit of Weno Limestone undivided, Kpwu, *south of Fort Worth area*; Pawpaw Formation, Weno Limestone, and Denton Clay undivided, Kpwd, *in Fort Worth area and northward*; middle shale and lower limestone units of Weno Limestone, Denton Clay, Fort Worth Limestone, and Duck Creek Formation undivided, Kwdfdc, *south of Fort Worth area*; Fort Worth Limestone and Duck Creek Formation undivided, Kfdc, *in Fort Worth area and northward; and* Duck Creek Formation, Kdc, *mapped separately in Parker County and western Tarrant County*

Pawpaw Formation, *claystone, mudstone, and sandstone. Claystone and mudstone, massive, slightly selenitic. Sandstone, fine to very fine grained, platy, ripple cross-laminations, light olive gray to medium gray. Forms grass-covered slopes. Marine megafossils. Thickness 10–25 feet, thins southward*

Weno Limestone, *consists of upper limestone, middle alternating clay and limestone, and lower limestone units. Upper limestone, aphanitic, in part bioclastic, soft and chalky to hard and compact, massive, light gray and yellowish gray; weathers gray and yellowish brown, forms a topographic bench; marine megafossils; thickness 2–20 feet, thins northward. Middle unit: In Tarrant County—mostly calcareous clay, massive, some lenses of sand-size shell debris, olive brown to olive gray; marine megafossils are oysters and molds of small pelecypods. In southwestern Johnson County—alternating limestone and clay; limestone, aphanitic, bioclastic, in part burrowed, some sparry bioclastic limestone, beds pinch and swell, 0.1–1.0 foot thick, medium gray, weathers yellowish brown; clay, calcareous, medium to dark gray, weathers yellowish gray and yellowish brown, fossils include pelecypods, ammonites, echinoids, vertebrate bones, and lignitized wood; thickness 15–45 feet, thins southward. Lower limestone, aphanitic, in part sandy, fossiliferous, burrowed to south, massive, progressively more resistant southward, forming scarp, light gray, medium gray where sandy, weathers yellowish brown, thickness 1–5 feet, thins northward. Thickness from about 60 feet in Tarrant County to about 25 feet in northern Hill County*

Denton Clay, *alternating clay, marl, and limestone, total limestone in unit remains about constant as amount of clay and marl varies. Clay, calcareous, considerable shell debris, locally burrowed, a few irregular calcareous concretions, units 1–3 feet thick, marine megafossils are* Anomia, Gryphaea, *and pelecypod molds. Marl, ranges from calcareous clay to aphanitic argillaceous limestone, soft, yellowish brown, weathers dusky brown. Limestone aphanitic,* Gryphaea*-bearing beds 0.1–0.3 foot thick, locally pinch and swell, dark gray, weathers dusky brown; marine megafossils are* Gryphaea, Pecten, *and* Anomia. *Thickness 6–25 feet, thins southward*

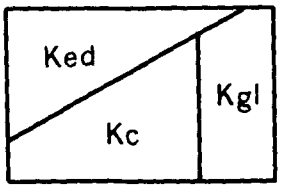
Fort Worth Limestone, *limestone and clay. Limestone, aphanitic to biosparite, burrowed, beds 0.2–2 feet becoming thicker and more massive southward, light to medium gray; weathers yellowish brown; marine megafossils are* Pecten, *oysters, echinoids, and ammonites. Clay, calcareous, in units 0.1–5 feet thick, medium gray to yellowish brown; weathers yellowish brown, forms low rolling hills. Thickness 25–35 feet*

Duck Creek Formation, Kdc, *limestone, aphanitic, in part bioclastic, locally burrowed, pyrite nodules up to 0.2 foot, beds 0.2–2 feet thick, pinch and swell, medium gray to yellowish gray; weathers dark gray with yellowish-brown patches, locally forms topographic benches; marine megafossils are* Gryphaea *and ammonites; thickness 30–100 feet, thins southward*

Kiamichi Formation

Clay and limestone in alternating units 0.1–5 feet thick; some sandstone. Clay, calcareous, olive brown, weathers yellowish brown, constitutes about two-thirds of formation. Limestone mostly aphanitic and bioclastic, locally burrowed, medium gray to yellowish gray; weathers yellowish brown. Sandstone, fine grained, moderately well sorted, calcareous, burrowed, beds 0.1–0.2 foot thick, medium gray; weathers yellowish brown. Marine megafossils are Gryphaea; *some* Pecten *in sandstone. Thickness 20–50 feet, thins southward*

Lower Cretaceous



Edwards Limestone, Comanche Peak Limestone, and Goodland Limestone

Edwards Limestone, Ked, *in thicker sections consists of an upper scarp-forming rudistid facies, a middle aphanitic to biosparite fossiliferous limestone, and a lower bioclast-packed aphanitic to sparry limestone with individual corals, light gray to yellowish gray; weathers various shades of gray with moderate brown patches; thickness up to 40 feet, gradually merges with Comanche Peak Limestone or Goodland Limestone in the vicinity of the northern Hood County line*

Comanche Peak Limestone, Kc, *limestone and some clay. Limestone mostly aphanitic, bioclastic to fossiliferous, soft, a few harder* Gryphaea-*bearing beds about 25 feet above base form benches, light to medium gray; weathers various shades of gray, locally mottled yellowish brown; marine megafossils are gastropods, ammonites, echinoids,* Pecten, Lima, Gryphaea, *and* Exogyra texana. *Clay, calcareous, intergradational with nodular limestone, beds 1–5 feet thick, medium to dark gray, weathers yellowish brown, fossiliferous. Thickness 90± feet*

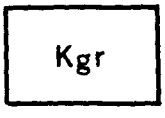
Goodland Limestone, Kgl, *intergradational laterally with Comanche Peak Limestone and differs from it chiefly in that the Goodland is more coarsely nodular, contains fewer and thinner clay beds, and massive resistant limestone beds are more numerous; upper 5 feet, massive, bioclast-packed aphanitic limestone and limestone composed of oolites in sparry calcite; thickness 90± feet*

Walnut Clay

Clay and limestone about equally abundant. Limestone, aphanitic; in part bioclastic, Gryphaea-*bearing, beds 0.1–1 foot thick; in part nodular, grades laterally into either resistant, bench-forming,* Gryphaea-*bearing limestone or calcareous clay; medium to dark gray, weathers yellowish brown. Clay, fossiliferous, calcareous, olive brown, weathers yellowish brown. Thickness 30± feet*

Paluxy Formation

Sandstone, mudstone, and limestone. Sandstone, fine to very fine grained, friable to calcite cemented, cross-beds common, in part massive, locally burrowed, light gray to greenish gray; weathers yellowish brown to dusky brown. Mudstone, sandy, massive, locally burrowed, greenish gray, olive green, and medium gray; weathers yellowish brown and red brown. Limestone locally in upper 40–50 feet, sandy, fossiliferous, beds 0.5–2 feet thick, yellowish gray; weathers mottled dark gray and yellowish brown. Thickness 95–105 feet



Glen Rose Formation

Limestone, alternating with units composed of variable amounts of clay, marl, and sand. Limestone, distinctly bedded, in part with variable amounts of clay, silt, and sand, soft to hard, various shades of brownish yellow and gray. Gradational to Paluxy Formation above and Twin Mountains Formation below, bench-forming beds included in the Glen Rose Formation. Thickness 40–200 feet, thins northward

CRETACEOUS

Lower Cretaceous

Missouri Series

?

Des Moines Series

Strawn Group

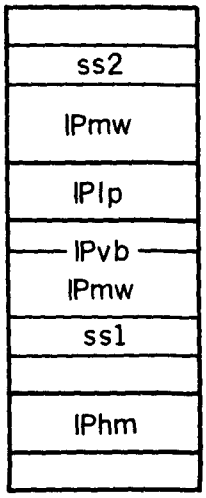
CRETACEOUS

PENNSYLVANIAN

Ktm

Twin Mountains Formation

Upper part claystone, middle part sandstone above claystone, lower part mostly sandstone, some claystone and conglomerate. Sandstone, fine to medium grained in middle part, medium to coarse grained in lower part, sorting best in middle part, friable, locally large scale cross-bedding, mostly light gray, some light brown near middle. Claystone, silty, mostly gray, locally in upper part green, yellow, red. Conglomerate, pebbles of chert and quartz, argillaceous, sandy, gray, brown. Thickness about 150 feet



Mineral Wells Formation

Mineral Wells Formation, Pmw, *shale, sandstone, conglomerate, and limestone;* sandstone, ss2, Lake Pinto Sandstone, Plp, Village Bend Limestone, Pvb, sandstone, ss1, *and* Hog Mountain Sandstone, Phm, *mapped separately. Shale, calcareous, locally contains sandstone and a few thin limestone beds, gray to black, a few plant fossils*

Sandstone, ss2, *fine to coarse grained, thin bedded to massive, brown, thickness 10 feet, feathers out southwestward on Abilene Sheet*

Lake Pinto Sandstone, Plp, *medium to fine grained, locally conglomeratic, thick bedded, brown, thickness 20–40 feet*

Village Bend Limestone, Pvb, *fine grained, locally sandy, thick bedded, yellow gray, weathers to small blocks, marine megafossils, forms laterally discontinuous lentils, thickness up to 3 feet*

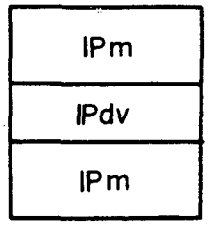
Sandstone, ss1, *locally conglomeratic, thickness about 30–40 feet, feathers out southwestward near Mineral Wells on Abilene Sheet*

Hog Mountain Sandstone, Phm, *fine to medium grained, thick bedded to flaggy, brown, thickness about 25 feet. Thickness of exposed part of Mineral Wells Formation 400–500 feet, overlapping Cretaceous rocks cover upper third and other portions of formation including Turkey Creek Sandstone and Dog Bend Limestone which are exposed on the Abilene Sheet immediately to the west*

IPbr

Brazos River Formation

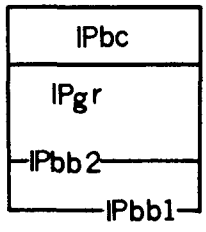
Sandstone, conglomerate, and mudstone; sandstone, coarse grained, ferruginous, cross-bedded, thick bedded to massive, reddish brown; mudstone, silty, gray, local lenses; conglomerate, angular pebbles of chert up to 1.5 inches in size, some clay ironstone, variegated, ferruginous cement common; thickness 100 feet



Mingus Formation

Mingus Formation, IPm, *shale and sandstone;* Dobbs Valley Sandstone, IPdv, *mapped separately. Shale, sandy, poorly bedded, gray to buff*

Dobbs Valley Sandstone, IPdv, *medium grained, locally calcareous, commonly massive, reddish-brown, some interbedded sandy shale, thickness about 45 feet. Thickness of exposed part of* Mingus Formation *about 200 feet; overlapping Cretaceous rocks cover lower part of formation including Santo Limestone; the Goen Limestone feathers out above the Dobbs Valley Sandstone a few miles to the west before reaching the Dallas Sheet*

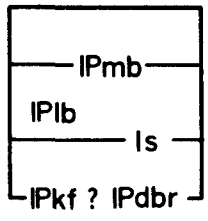


Grindstone Creek Formation

Grindstone Creek Formation, IPgr, *shale, sandstone, and limestone;* Buck Creek Sandstone, IPbc, *and* Brannon Bridge Limestones, IPbb2 *and* IPbbl, *mapped separately. Shale, in part sandy, locally contains thin coal beds and sandstone lentils, gray*

Buck Creek Sandstone, IPbc, *coarse grained, massive, reddish brown, forms prominent scarp, thickness about 30 feet*

Brannon Bridge Limestones, IPbb2 *and* IPbb1, *fine grained, some interbedded shale, dark chert lenses in IPbb2, bedding uneven, indistinct to medium, gray, units up to about 15 feet thick, form distinct scarps and broad dip slopes; about 10 feet of shale separates the two limestone units. Thickness of exposed part of* Grindstone Creek Formation *about 225 feet; overlapping Cretaceous rocks cover upper part of formation; a third and higher Brannon Bridge Limestone feathers out a few miles to the west within the Abilene Sheet*



Lazy Bend Formation

Lazy Bend Formation, IPlb, *shale, sandstone, and limestone;* Meek Bend Limestone, IPmb, unnamed limestone, ls, Dennis Bridge Limestone, IPdbr, *and* Kickapoo Falls Limestone, IPkf, *mapped separately. Shale, in part sandy, in part silty, local coal beds, and unmapped limestone lentils*

Meek Bend Limestone, IPmb, *fine grained, bedding thin flaggy to massive, gray, marine megafossils; thickness about 12 feet, exposed only in small creek west of Brazos River, well exposed on Abilene Sheet to the west*

Limestone, ls, *fine grained, locally grades into sandstone, medium to thin bedded, gray to brown, marine megafossils; thickness up to 6 feet, outcrop discontinuous and poorly exposed*

Dennis Bridge Limestone, IPdbr, *fine grained, massive at base to thin bedded at top, gray to light brown, marine megafossils; thickness 10 feet, exposed at south end of Dennis Bridge over Brazos River and vicinity, approximately equivalent to Kickapoo Falls Limestone*

Kickapoo Falls Limestone, IPkf, *fine grained, thick to medium bedded, upper part nodular, light gray, mottled dark gray, marine megafossils and algae; thickness up to 12 feet, approximately equivalent to Dennis Bridge Limestone, outcrop confined to Kickapoo Creek inlier. Thickness of* Lazy Bend Formation *275 feet*

PENNSYLVANIAN

Des Moines Series

Strawn Group

IPu

Unnamed Pennsylvanian rocks

Shale, limestone, and sandstone. Shale, locally sandy and silty, some thin sandstone beds and impure limestone lentils, gray to deep dull red; thickness exposed beneath Cretaceous overlap about 75 feet, comprises rocks cropping out beneath Dennis Bridge and Kickapoo Falls Limestones, best exposed along Kickapoo Creek, downstream from Kickapoo Falls crossing

PENNSYLVANIAN

Geologic mapping by Shell Oil Company, Humble Oil & Refining Company, Dallas Geological Society, Fort Worth Geological Society, Shell Development Company, J. H. McGowen, C. V. Proctor, Jr., W. T. Haenggi, D. F. Reaser, and sources shown on the Index of Geologic Mapping. Paleozoic mapping by L.F. Brown, Jr., and J. L. Goodson. J. H. McGowen, C. V. Proctor, Jr., W. T. Haenggi, and D. F. Reaser compiled the geologic mapping on high altitude aerial photographs, compiled unmapped areas photogeologically, and field checked all mapping. V. E. Barnes remapped, but did not field check, Quaternary deposits of Dallas and Tarrant counties using U.S. Geological Survey 7.5-minute quadrangles. Geologic mapping reviewed by Geologic Atlas Project Committees of the Dallas Geological Society, R. J. Cordell (Sun Oil Company), Chairman, E. G. Wermund (Mobil Research and Development Corporation), and R. L. Laury (Southern Methodist University); and the Fort Worth Geological Society, W. J. Nolte (Independent Geologist), Chairman, Leo Hendricks (Texas Christian University), and Edward Heuer. Geology scribed by J. W. Macon and Barbara Hartmann.

REFERENCE 4

TEXAS WATER COMMISSION

PROTECTING TEXANS' HEALTH AND SAFETY BY PREVENTING AND REDUCING POLLUTION

July 15, 1991

Mr. Alex Zocchi
ICF Kaiser Engineers
1509 Main Street
Suite 900
Dallas, Texas 75201

Re: Texas' Wellhead Protection (WHP) Program

Dear Mr. Zocchi:

I would like to thank you for your recent inquiry on Texas' WHP Program. The program is jointly administered by the Texas Water Commission (lead agency) and the Texas Department of Health (TDH). On June 19, 1989, the State of Texas submitted its WHP program description to the Environmental Protection Agency (EPA), pursuant to Section 1428 of the Safe Drinking Water Act (SDWA), as amended in 1986. Under Section 1428, EPA is required to evaluate each State program to determine whether it is adequate to protect public water supply (PWS) wells from contaminants that may have any adverse effects on public health. On March 19, 1990, Texas' WHP Program was fully approved by EPA for the purposes of Section 1428 of the SDWA. Because the program description is approximately 300 pages long, I will be happy to provide you with highlights and requirements contained within our program description.

Designation of a restricted use area around a public drinking water well is one way of protecting underground water supplies. This area is referred to as a wellhead protection area and it is defined as the surface and subsurface area surrounding a public water well or well field through which contaminants could likely pass and eventually reach the ground water supply.

The basic concept of the program is the minimization of land use restrictions while maximizing ground water protection. To accomplish this, the Texas Water Commission (TWC) delineates WHP areas based on aquifer parameters, a five-year travel time for potential contaminants, and best professional judgement to prevent ground water contamination. The TDH reviews contingency plans for the provision of alternate water supplies in the event of contamination of the existing source. Local governments provide an inventory of all potential sources of contaminants within their WHP areas; then they implement the program. Guidance to local governments with respect to the inventory of potential contaminant sources, and other required technical assistance as needed, is provided by the TWC and the TDH.

Since Section 26.177 of the Texas Water Code requires that every city of the state having a population of 5,000 inhabitants or more establish a water pollution control and abatement program for the city which includes the inventorying and monitoring of potential contamination sources, the TWC encourages formal participation in the WHP program. Formal participation involves: 1) the TWC providing official WHP area delineations; 2) the entity conducting an inventory of all potential contaminant sources; 3) the TWC and the TDH preparing an official report which is used to brief the participating entity; 4) the entity then enacting appropriate best management practices to prohibit or control the inventoried sources which are a threat to ground water; and 5) lastly, the entity conducting a re-inventory of potential pollution sources at two to five year intervals which is provided to the sate for updating purposes.

An entity which participates in the program realizes immediate benefits in that it is assured that its ground water supply is better protected form the many potential contaminant sources. As additional incentive, those PWS systems which can demonstrate a lower risk from potential contamination may be granted reduced well monitoring requirements by the TDH.

I hope this brief overview has helped you understand how our program functions. In addition, I have enclosed a list of communities currently participating in wellhead protection. Should you have any questions, please feel free to contact me at 512/371-6332.

Sincerely,

David P. Terry, M.En.
Ground Water Section

DPT:km

Enclosure

WELLHEAD PROTECTION PROGRAM ASSESSMENT

CITY	# OF WELLS	# OF WHP AREAS	START DATE	RPT DATE
Alamo,City of	2	1	09/20/89	/ /
Alvin,City of	5	3	02/07/88	/ /
Amarillo,City of	106	0	06/07/89	/ /
Atlanta,City of	4	2	12/06/89	08/15/90
Bardwell,City of	2	1	06/06/91	/ /
Bartlett,City of	2	2	04/26/89	08/30/90
Bartonville Water Supply Corp.	4	3	09/15/89	/ /
Bay City,City of	6	5	05/04/89	08/15/90
Beaumont,City of	3	3	01/17/89	/ /
Benbrook,City of	16	10	04/02/91	/ /
Bethany Water Supply Corp	6	2	05/24/91	/ /
Bevil Oaks,City of	2	1	01/17/89	08/08/90
Brazoria,City of	3	2	01/17/89	08/30/90
Bridge City,City of	3	2	01/17/89	/ /
Bryan,City of	8	8	10/27/88	/ /
Buckholts,City of	1	1	01/17/89	08/30/90
Carrollton,City of	1	1	11/10/89	/ /
Charterwood M.U.D.	2	1	10/03/89	/ /
China,City of	3	1	01/17/89	/ /
Claude,City of	4	4	05/25/89	/ /
Clear Lake,City of	6	2	04/18/90	05/01/91
Cleveland,City of	5	3	12/01/88	/ /
Colony,The	7	4	04/22/91	/ /
Commerce,City of	7	7	04/02/91	/ /
Cumby,City of	4	1	07/05/89	08/01/90
Deer Park,City of	3	3	03/20/89	08/31/90
Del Rio,City of	4	1	10/01/86	12/01/86
Desoto,City of	1	1	05/09/91	/ /
Devine,City of	6	6	10/27/88	/ /
Dimmitt,City of	13	0	06/07/89	/ /
Dumas,City of	13	13	06/07/88	12/01/88
Eagle Bluff Assoc. Inc.	2	1	05/02/89	06/30/89
El Paso,City of	137	44	11/01/89	05/01/90
Eldorado Air Force Station	2	2	03/24/89	/ /
Fayette WSC	4	4	10/10/89	08/08/90
Flo Community WSC	3	2	10/27/88	08/08/90
Fort Bliss	14	10	01/15/90	07/20/90
Friendswood,City of	6	6	12/11/89	/ /
Friona,City of	11	3	06/07/89	/ /
Frost,City of	2	1	04/02/91	/ /
Gause,City of	1	1	01/17/89	08/31/90
George West,City of	2	1	04/16/90	/ /
Grand Prairie,City of	12	12	03/01/89	/ /
Groom,City of	2	2	07/12/88	12/01/88
Gruver,City of	2	1	06/07/89	/ /
Gunter Rural Water Supply Corp	3	2	06/06/91	/ /
Haslet,City of	3	2	06/06/91	/ /
Hereford,City of	29	0	05/17/89	/ /
Hildalgo,City of	3	1	01/17/89	/ /

WELLHEAD PROTECTION PROGRAM ASSESSMENT

CITY	# OF WELLS	# OF WHP AREAS	START DATE	RPT DATE
Houston,City of	214	0	06/06/90	/ /
Hurst,City of	6	6	10/27/88	05/25/89
Irving,City of	5	5	10/27/88	01/04/91
Jacksonville,City of	5	2	09/12/89	/ /
Johnson Co. Fresh Water Dist.1	7	3	06/06/91	/ /
Jourdanton,City of	3	3	10/27/88	/ /
Katy,City of	5	5	05/24/88	12/01/88
Keller,City of	11	6	05/09/91	/ /
Kennedale,City of	4	4	12/21/87	04/01/88
Kilgore,City of	9	9	10/27/88	/ /
Kingwood,City of	8	8	10/27/88	/ /
Kirby,City of	2	1	10/10/89	/ /
Kountze,City of	2	1	01/17/89	/ /
Kress,City of	4	2	07/19/89	/ /
Lamar I.S.D.	3	3	05/24/88	12/01/88
Lamesa,City of	8	1	10/10/89	/ /
Little Elm,Town of	8	4	04/22/91	/ /
Lumberton,City of	3	3	01/17/89	/ /
Maloy Water Supply Corporation	1	1	06/06/91	/ /
Marlow WSC	0	2	01/17/89	08/08/90
Martindale,City of	1	1	05/02/89	/ /
McLean,City of	4	4	07/12/88	12/01/88
Meeker,City of	2	1	01/17/89	/ /
Mercedes,City of	1	1	09/20/89	/ /
Midlothian,City of	2	2	05/21/91	/ /
Milano WSC	2	2	01/17/89	08/15/90
Military Highway WSC	2	2	10/10/89	/ /
Mineola,City of	3	3	10/10/89	/ /
Minerva WSC	2	2	01/17/89	08/08/90
Nash,City of	2	2	05/18/89	11/01/89
New Caney,City of	2	2	11/15/90	/ /
North Milam WSC	4	4	01/17/89	/ /
North Shore Water Supply Corp	2	2	05/09/91	/ /
Orange Grove,City of	2	2	10/27/88	02/01/90
Orange,City of	4	3	01/17/89	/ /
Ovilla Community System	2	1	04/22/91	/ /
Panhandle,City of	3	3	07/12/88	12/01/88
Panola,City of	2	2	01/17/89	/ /
Pantego,City of	6	2	05/24/91	/ /
Perryton,City of	11	11	06/07/88	12/01/88
Pinehurst,City of	2	1	01/17/89	/ /
Pinewood,City of	2	2	01/17/89	/ /
Plainview,City of	16	1	10/27/88	/ /
Pleasanton,City of	9	9	10/27/88	/ /
Porter W.S.C.	5	5	10/23/90	/ /
Poth,City of	2	2	10/27/88	08/08/90
Quail Valley Util. Dist.	4	4	10/27/88	/ /
Queen City,City of	1	1	05/15/90	08/30/90
Quitaque,City of	2	1	03/08/91	/ /

WELLHEAD PROTECTION PROGRAM ASSESSMENT

CITY	# OF WELLS	# OF WHP AREAS	START DATE	RPT DATE
Red Oak,City of	5	2	05/09/91	/ /
Redwater,City of	2	2	05/17/89	01/01/90
Refugio,City of	3	2	02/23/90	/ /
Rockdale,City of	5	5	01/17/89	08/31/90
Rocksprings,City of	2	2	10/27/88	/ /
Rosenberg,City of	5	5	05/24/88	12/01/88
Salado W.S.C.	4	1	08/23/90	/ /
San Marcos,City of	4	2	10/27/88	/ /
Shallowater,City of	7	1	04/23/90	/ /
Shenandoah,City of	2	2	10/16/90	/ /
Silsbee,City of	3	3	01/17/89	08/10/90
Sinton,City of	3	3	10/27/88	02/01/90
Skellytown,Town of	4	4	05/31/89	/ /
Smithville,City of	3	1	10/27/88	/ /
Sonora,City of	5	1	12/20/89	/ /
Sour Lake,City of	2	2	01/17/89	/ /
Southwest Milam WSC	5	5	01/17/89	08/30/90
Spearman,City of	5	3	03/07/91	/ /
Stephenville,City of	29	17	04/22/91	/ /
Sterling,City of	9	4	10/27/88	/ /
Stinnett,City of	2	0	05/18/89	/ /
Sugarland,City of	7	4	01/17/89	/ /
Sweeny,City of	3	1	09/01/89	11/01/89
Tyler,City of	13	13	10/27/88	/ /
Venus,City of	2	2	04/02/91	/ /
Victoria,City of	15	12	10/15/90	/ /
Vidor,City of	3	3	01/17/89	/ /
West Orange,City of	2	1	01/17/89	/ /
White Deer,City of	3	3	07/12/88	12/01/88
Wilmer,City of	2	2	07/11/90	/ /
*** Total ***	1059	444		

PA

DOCUMENTATION LOG SHEET

SITE:	FARED (Robot) Systems
IDENTIFICATION NUMBER:	TXD987996782
CITY:	Fort Worth
STATE:	Texas

REFERENCE NUMBER	DESCRIPTION OF THE REFERENCE
1	Potential Hazardous Waste Site Identification, EPA Form 2070-8. Prepared by Ecology and Environment, for the EPA Region VI. April 19, 1990.
2	U.S.G.S. 7.5 Minute Series Topographic Map. Hurst, Texas, 1959. Photorevised 1981.
3	Geologic Atlas of Texas, Dallas Sheet. Prepared by the Army Corp of Engineers for the U.S.G.S. 1972.
4	Record of Communication. Harold Spindle's current address and telephone number. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Information Operator, AT&T. November 20, 1990. TXD987996782.
5	Record of Communication. Date Fared (Robot) Systems began operation. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Dallas Public Library, Business and Technology Section. November 20, 1990. TXD987996782.
6	Industrial Solid Waste Management Inventory, Initial Notification. Prepared by Fared (Robot) Systems for the Texas Water Commission. August 24, 1987.
7	Notice of Registration, Solid Waste Management. Prepared by the Texas Water Commission. October 13, 1987.
8	Water-Level and Water-Quality Data from Observation Wells in Northeast Texas (Report 198). Prepared by Howard D. Taylor for the Texas Water Development Board. February 1976.
9	Occurrence, Availability, and Chemical Quality fo Ground Water in the Cretaceous Aquifers of North-Central Texas, Volume 1 (Report 269). Prepared by the Texas Department of Water Resourses. April 1982.

10 Record of Communication. Source of drinking water for Fort Worth Texas. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Mike Jones, Engineer, Fort Worth Water Department. TXD987996782.

11 Soil Survey of Tarrant County, Texas. Prepared by the U.S. Department of Agriculture Soil Conservation Service in Cooperation with the Texas Agriculture Experiment Station. June 1981.

12 Texas Water Quality Standards, Informational Copy. Prepared by the Texas Water Commission. December 1986.

13 Water Resourses Data - Water Year 1989, U.S. Geological Survey Water Data Report TX-89-1. Prepared in Cooperation with the State of Texas and Other Agencies. Volume 1. 1989.

14 Federal Emergency Management Agency. Flood Insurance Rate Map. City of Fort Worth, Texas, Tarrant and Denton Counties. Panal 55 of 160. Map Revised on November 18, 1988.

15 Hershfield, David. Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours, and Return Periods from 1 to 100 Years. Technical Paper 40. U.S. Department of Agriculture, Soil Conservation Service: Washington D.C., May 1961.

16 Record of Communication. Population and Area of Fort Worth and Tarrent County, Texas. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Marsha Carpenter, Economic department, Fort Worth Chamber of Commerce. November 26, 1990. TXD987996782.

17 Record of Communication. Fishing on the West Fork of the Trinity River. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Carol Rathers, Public Information Officer, Trinity River Authority, December 13, 1990. TXD987996782.

18 Record of Communication. Information concerning sensitive environments in the area of Fared (Robot) Systems. From: Tom Ritchie, FIT Geologist, ICF Technology, Inc. To: Dorinda Sullivan, Natural Herritage Foundation. November 8, 1990. TXD987996782.

19 U.S.G.S. State of Texas Map. 1985

20 Letter. HRS Net Precipitation Values. From: Andrew M. Platt, Group Leader, MITRE Corporation. To: Lucy Sibold, U.S. Environmental Protection Agency. May 26, 1988. Attachments.

21 Record of Communication. Water Intakes Along the West Fork of the Trinity River. From: Tom Ritchie, FIT Geologist, ICF Technology. To: Mark Evans, Water Rights Section, Texas Water Commission. July 18, 1991. TXD987996782.

22 Record of Communication. Number of Employees at Allied Electronics on Pebble Drive, Fort Worth, TX. From: Tom Ritchie, FIT Geologist, ICF Technology. To: Receptionist, Allied Electronics. July 25, 1991. TXD987996782.

23 Letter. Texas' Wellhead Protection (WHP) Program. From: David P. Terry, Ground Water Section, Texas Water Commission. To: Alex Zocchi, FIT Engineer, ICF Kaiser Engineers. July 15, 1991.

REFERENCE 5

RECORD OF COMMUNICATION

Reference 5

TYPE: Telephone Call **DATE:** 11-19-90 **TIME:** 10:30 a.m.

TO: Dallas Public Library
Business and Technology
Section
(214) 670-1608

FROM: Tom Ritchie
FIT Geologist
ICF Technology, Inc.
(214) 744-1641

SUBJECT: Date Fared Robot Systems (FRS) began operations.

SUMMARY OF COMMUNICATION

FRS began operations in July, 1982, and was incorporated in September, 1983.

REFERENCE 6

TEXAS WATER COMMISSION

INDUSTRIAL SOLID WASTE MANAGEMENT INVENTORY
Initial Notification

Farid Robot

RETURN TO:
TEXAS WATER COMMISSION
REGISTRATION AND
CLASSIFICATION UNIT
P.O. BOX 13087, CAPITOL STATION
AUSTIN, TEXAS 78711

PLEASE RETURN WITHIN 30 DAYS

PART I. INTRODUCTION

The Texas Solid Waste Disposal Act authorizes the Texas Water Commission (TWC) to regulate all industrial solid waste activities in Texas. This form should be completed and returned to the address given above. Please complete all applicable pages and sign on page 9.

THIS FORM IS FOR INITIAL NOTIFICATION ONLY

For changes and additions to existing registrations, please use the registration update form.

1. Does your firm generate Industrial Solid Waste(s) as defined below?

☑ Yes ☐ No

"Industrial solid waste" means any solid waste resulting from or incidental to any process of industry or manufacturing, mining or agricultural operations.

"Solid waste" means any garbage, rubbish, sludge from a waste treatment plant, water supply treatment plant or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, municipal, commercial, mining, and agricultural operations, and from community and institutional activities, but does not include: (i) solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation return flows, or industrial discharges subject to regulation by permit issued pursuant to Chapter 26 Water Code; (ii) soil, dirt, rock, sand and other natural or man-made inert solid materials used to fill land if the object of the fill is to make the land suitable for the construction of surface improvements, or (iii) waste materials which result from activities associated with the exploration, development, or production of oil or gas and are subject to control by the Texas Railroad Commission.

2. Describe the nature of your business, including the products manufactured and services rendered at the facility.

Fabrication of automated equipment - machined, welded & painted parts.

PART II. GENERAL INFORMATION

Please provide the information requested in the boxes below.

Office Use Only

38093
1 5
Registration No.

PKNAING
7 18
U.S. EPA I.D. Number
(if applicable)

RECEIVED
OCT - 1 1987
DISTRICT 4

8-27-87

RUHC

2014 / FS 44

Part II. General Information—Continued

OFFICE USE ONLY
Registration Number
8073

Line Action

0 1 A (20–23)

FARED Robot Systems Inc (27–56)
Company Name

(58–87)
Company Name Continued (if needed)

PO BOX 185579 (89–118)
Mailing Address

0 2 A (20–23)

FORT WORTH (27–46) TX (48–49) 76185579 (51–59)
City State Zip Code

DAVID VARBROUGH (65–82) 817-284-3401 (84–93)
Person to Contact Regarding Solid Waste Management Telephone

(62) –
Employee Group
"–" = less than 100 employees
"+" = greater than or equal to 100 employees
Enter "–" or enter "+"

0 3 A (20–23)

7410 PEBBLE DRIVE FORT WORTH TX (53–87)
Site Location

(87–100)
Site Location—Continued

04 (33–34)
District

220 (49–51)
County (see Table 1, p. 10)

REPORTING REQUIREMENTS & EFFECTIVE DATES

Annual	Monthly	Periodic	None
AUG 87			
102 M M Y Y	108 M M Y Y	114 M M Y Y	121

OFFICE USE ONLY

Region (37–38)	Basin (41–42)	Segment (44–47)

Enter the appropriate codes for the location of your generating site.

STANDARD INDUSTRIAL CLASSIFICATION CODES (SIC)

0 5 A (23)

01 (26–30)	02 (31–35)	03 (36–40)	04 (41–45)	05 (46–50)	06 (51–55)	07 (56–60)
3599						

08 (61–65)	09 (66–70)	10 (71–75)	11 (76–80)	12 (81–85)	13 (86–90)	14 (91–95)

These code classify your establishment by the type of industrial or manufacturing activity you are engaged in. Refer to the Standard Industrial Classification Manual prepared by the Office of Management and Budget (U.S. Government Printing Office) if you do not know the appropriate SIC codes for your company.

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Registration Number
38093

The following questions refer to transportation of industrial solid waste.

Do you transport Class I or hazardous industrial solid waste in the State of Texas?

☐ Yes ☑ No

If "no" skip to the Section below entitled REGISTRATION TYPE.

Enter the letter corresponding to the method of transport in box number 31.

0	4		A		☐
20		23			31

H-highway; R-rail; P-pipeline; W-water

What type of wastes do you transport (e.g. spent acids, metal plating sludge, etc.)?

Do you operate a transfer facility as described in 31 TAC 335.94? ☐ Yes ☐ No
If "yes" complete page 7 except for which wastes are treated, stored or disposed.

Carrier classification: Check all applicable categories.

☐ Private ☐ For hire ☐ Interstate ☐ Intrastate Foreign: ☐ In ☐ Out

REGISTRATION TYPE

0	4		A		G
20		23			27

This question refers to all industrial solid waste, both hazardous and non-hazardous. Enter the letter of the most appropriate category from the list below in box number 27 to the left.

Code	Description
G	***generator***—any person, by site, who produces industrial solid waste; any person who possesses industrial solid waste to be shipped to any other person; or any person whose act first causes a solid waste to become subject to regulation.
R	***receiver***—persons who accept industrial solid waste from an off-site source. PLEASE NOTE—Receipt of industrial solid waste from an off-site source is an activity that requires a permit from the Texas Water Commission pursuant to 31 TAC Section 335.2.
T	***transporter***—any person who conveys or transports industrial solid waste by truck, ship, pipeline, or other means.
A	***generator/transporter***—persons who are both generators and transporters of industrial solid waste.
B	***receiver/transporter***—persons who are both receivers and transporters of industrial solid waste.
D	***generator/receiver/transporter***—persons who are generators, receivers and transporters of industrial solid waste.

OFFICE USE ONLY

0 4 A (20–23) — Reg. Date (35): 082187 — Amend. Date (44) — Initials (53): DJC

0 3 A (20–23) — Reg. Status (27): A

0 2 A (20–23) — Permit # (95–99):

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Registration Number
38093

HAZARDOUS WASTE STATUS

This question refers to hazardous waste as defined in 40 CFR 261. (Copies of these regulations are available through TWC offices.) - Leave this question blank if you do not generate, treat, store or dispose of hazardous waste and never obtained an EPA I.D. number. Enter the number or letter of the most applicable category from the list below in box number 30.

Line	Action
20	03
23	A
30	3

1 ***generator***—any person, by site, who produces hazardous industrial solid waste; any person who possesses hazardous industrial solid waste to be shipped to any other person; or any person whose act first causes a hazardous industrial solid waste to become subject to regulation under 31 TAC Chapter 335.

2 ***non-handler***—persons who do not generate hazardous waste but have obtained an EPA I.D. Number.

3 ***small quantity generator***-persons who qualify as a small quantity hazardous waste generator as defined in 31 TAC Section 335.61.

4 ***generator/TSD facility***—persons who generate and also treat, store or dispose of hazardous waste (see #1 and #8).

5 ***generator/transporter***—persons who produce hazardous waste and also transport hazardous waste (see #1 and #7).

6 ***generator/transporter/TSD facility***—persons who generate, transport and treat, store or dispose of hazardous waste (see #1, #7, and #8).

7 ***transporter***—any person who conveys or transports hazardous industrial solid waste by truck, ship, pipeline, or other means.

8 ***TSD facility***—persons engaged in treatment, storage, and/or disposal of hazardous waste unless excluded from permit requirements by reasons defined in 31 TAC Section 335.2 (d), (e) and (f), 31 TAC 335.69 and 335.94. Treatment is defined as the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of hazardous industrial solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste non-hazardous, or less hazardous; safer to transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. Storage means the holding of solid waste for a temporary period, at the end of which the waste is processed, disposed of, or stored elsewhere. Disposal facility means a facility at which hazardous waste is intentionally placed into or on any land or water, and at which waste will remain after closure. PLEASE NOTE—TSD facilities must be authorized by permit from the Texas Water Commission pursuant to 31 TAC Section 335.42.

9 ***small quantity generator/transporter***—small quantity generators who also transport hazardous waste (see #3 and #7).

B ***transporter/TSD facility***—transporters of hazardous waste who also treat, store and dispose of hazardous waste (see #7 and #8).

C ***closed***—a facility which has closed in accordance with approved facility closure plans and all applicable requirements.

D ***TSD facility/small quantity generator***—persons who are small quantity generators and also treat, store or dispose of hazardous wastes (see #8 and #3).

Office Use Only
Registration Number 3 3 0 9 7

PART III. WASTE CHARACTERISTICS AND HANDLING PRACTICES - CONTINUED

Complete this page for each waste you generate. Space is provided on this form for two wastes. Copy this form as needed if you generate more than two wastes.

Line Action: 3 1 A (20–23)

Sequence Number: Waste No. 0 0 1 of 6 (27)

Number each waste sequentially starting with 001, 002, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

9 1 0 5 0 GP (31) OFFICE USE ONLY 1 2 4 (38)

Verbal description of the waste	Describe the process from which the waste is generated
Methyl ethyl Ketone (MEK)	Used as Paint Cleaner

Waste components—chemical compositions and amount (in % or mg/l) of each	Amount generated per month
Methyl ethyl Ketone 99.8%	30 kg

Texas regulations require generators to make a proper Hazardous Waste Determination (31 TAC 335.62). The definition of hazardous waste is in 40 CFR Part 261.3. Is the waste described above a hazardous waste? ☑ yes ☐ no. If hazardous, list applicable hazardous waste numbers as found in 40 CFR Part 261.

3 1 A (20–23) U 1 5 9 (42–49) (56) (63) (70) (77) (84)

Physical state (check one) ☐ solid ☑ liquid; ☐ semi solid or sludge; _____ % solids

Toxicity information (if available) _____

☑ ignitability ☐ corrosivity ☐ odor ☐ other

Provide details below

Flash Point: Tag Open Cup 30°F (1°C)
" Closed Cup 20°F (7°C)

Waste Handling Practices Check all categories that describe how this waste is handled. For example, if this waste is temporarily stored on-site then sent off-site for disposal check both on-site and off-site.

☑ ***on-site***—For *hazardous* waste, on-site storage, processing, or disposal is defined in 31 TAC 335.42. For *non-hazardous* waste, on-site is defined in 31 TAC 335.1. *Complete the Facility Information sheet (p. 7) if you check this box.*

☑ ***off-site***—Any storage, treatment or disposal of waste which is not characterized as on-site.

Number of off-site shipments per year: 2

☐ ***sanitary sewer***—Waste is sent to a publicly-owned treatment work.

☐ ***off-site via pipeline***—Waste is piped off the generation site property by pipeline.

☐ ***other***—Describe any handling of your waste not described by the above categories _____

MATERIAL SAFETY DATA SHEET

METHYL ETHYL KETONE
MEK

HMN 55

CELANESE CHEMICAL COMPANY, INC.

1250 W. MOCKINGBIRD LANE / DALLAS, TX 75247 / EMERGENCY PHONE: 806-665-5522 / INFORMATION PHONE: 214-689-4000

61/20896

IDENTIFICATION

ISSUED NOVEMBER 25, 1985

PRODUCT NAME: Methyl ethyl ketone
CHEMICAL NAME: Methyl ethyl ketone
CHEMICAL FAMILY: Ketone
SYNONYMS: 2-Butanone; MEK; ethyl methyl ketone; methyl acetone; butanone-2.

FORMULA: $CH_3COCH_2CH_3$
MOLECULAR WEIGHT: 72
CAS NUMBER: 78-93-3
CAS NAME: 2-Butanone

DEPARTMENT OF TRANSPORTATION INFORMATION
HAZARD CLASSIFICATION: Flammable Liquid
SHIPPING NAME: Methyl Ethyl Ketone

UNITED NATIONS NUMBER: UN 1193
DOT EMERGENCY RESPONSE GUIDE NUMBER: 26

PHYSICAL DATA

BOILING POINT (760 mm Hg): 79.6°C (175°F)
SPECIFIC GRAVITY (H_2O = 1 @ 20/20°C): 0.8062
VAPOR DENSITY (AIR = 1 @ 20°C): 2.5
PERCENT VOLATILES BY VOLUME: 100
APPEARANCE AND ODOR: Clear, colorless, mobile liquid with strong characteristic "ketone" odor.

FREEZING POINT: -86.7°C (-124°F)
VAPOR PRESSURE (20°C): 77.5 mm Hg
SOLUBILITY IN WATER (% by WT @ 20°C): 26.8
EVAPORATION RATE (BuAc = 1): 5.7

HAZARDOUS INGREDIENTS: Methyl ethyl ketone, 99.8%

FIRE AND EXPLOSION HAZARD DATA

FLAMMABLE LIMITS IN AIR, % BY VOLUME — Upper: 11.0; Lower: 2.0

FLASH POINT (TEST METHOD):
TAG OPEN CUP (ASTM D1310): 30°F (1°C)
TAG CLOSED CUP (ASTM D56): 20°F (7°C)

SPECIAL HAZARD DESIGNATIONS

	HMIS	NFPA
HEALTH:	2	1
FLAMMABILITY:	3	3
REACTIVITY:	0	0
PROTECTIVE EQUIPMENT:	SG	--

KEY: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

OSHA 29CFR1910.1200 EVALUATION: Hazardous

EXTINGUISHING MEDIA: Use CO_2 or dry chemical for small fires, alcohol-type aqueous film-forming foam or water spray for large fires. Water may be ineffective but should be used to cool fire-exposed structures and vessels.

SPECIAL FIRE FIGHTING PROCEDURES: Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists. Water spray can be used to reduce intensity of flames and to dilute spills to nonflammable mixture.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback. Material creates a special hazard because it floats on water.

REACTIVITY DATA

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Heat, sparks and flame.

MATERIALS TO AVOID: Caustic soda and other strong alkalis; hydrochloric, sulfuric and other strong inorganic acids; amines; oxidizing agents such as hydrogen peroxide, nitric acid, perchloric acid or chromium trioxide.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS: Carbon monoxide.

6

Office Use Only
Registration Number
5 5 0 0 3

PART III. WASTE CHARACTERISTICS AND HANDLING PRACTICES - CONTINUED

Complete this page for each waste you generate. Space is provided on this form for two wastes. Copy this form as needed if you generate more than two wastes.

Line Action: 3 1 A (20–23)

Sequence Number: Waste No. 0 0 2 (27) of 5

Number each waste sequentially starting with 001, 002, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

9 1 9 9 6 0 (31) OFFICE USE ONLY 1 2 C (38)

Verbal description of the waste	Describe the process from which the waste is generated
Laquer Thinner	mixed with paint for spray painting.
Waste components—chemical compositions and amount (in % or mg/l) of each	**Amount generated per month**
See Attached MSDS Section II	30 kg.

Texas regulations require generators to make a proper Hazardous Waste Determination (31 TAC 335.62). The definition of hazardous waste is in 40 CFR Part 261.3. Is the waste described above a hazardous waste? ☑ yes ☐ no. If hazardous, list applicable hazardous waste numbers as found in 40 CFR Part 261.

3 1 A (20–23) U 2 2 0 U 2 3 9 U 1 5 4 U 0 0 2 (42–84)

Physical state (check one) ☐ solid ☑ liquid; ☐ semi solid or sludge; _____ % solids

Toxicity information (if available) _____

☑ ignitability ☐ corrosivity ☐ odor ☐ other

Provide details below

Flash Point: 3 F TCC LEL 0.9

Waste Handling Practices Check all categories that describe how this waste is handled. For example, if this waste is temporarily stored on-site then sent off-site for disposal check both on-site and off-site.

☑ ***on-site***—For *hazardous* waste, on-site storage, processing, or disposal is defined in 31 TAC 335.42. For *non-hazardous* waste, on-site is defined in 31 TAC 335.1. *Complete the Facility Information sheet (p. 7) if you check this box.*

☑ ***off-site***—Any storage, treatment or disposal of waste which is not characterized as on-site.

Number of off-site shipments per year: 52

☐ ***sanitary sewer***—Waste is sent to a publicly-owned treatment work.

☐ ***off-site via pipeline***—Waste is piped off the generation site property by pipeline.

☐ ***other***—Describe any handling of your waste not described by the above categories _____

R7 K 120

MATERIAL SAFETY DATA SHEET

23 FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, Ohio 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
7-Aug-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NUMBER
R7 K 120

* - Trade Mark

PRODUCT NAME
OPEX* Lacquer Thinner

PRODUCT CLASS
Reducer

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
64742-89-8	Lt. Aliphatic Hydrocarbon Solvent.	20	100.	364.	1.0	53.0
64742-48-9	V. M. & P. Naphtha.	15	300.	1350.	0.9	12.0
108-88-3	Toluene.	15	100.	375.	1.0	22.0
1330-20-7	Xylene.	5	100.	435.	1.0	5.9
67-56-1	Methanol	<5	200.	260.	6.0	92.0
64-17-5	Ethanol	5	1000.	1900.	3.3	44.0
78-83-1	2-Methyl-1-propanol	5	50.	150.	1.2	8.7
111-76-2	2-Butoxyethanol	<5	25.	120.	1.1	0.6
67-64-1	Acetone.	20	750.	1780.	2.2	180.0
110-43-0	Methyl n-Amyl Ketone.	<5	50.	235.	1.1	2.1
110-19-0	Isobutyl Acetate.	5	150.	700.	1.3	12.5

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
132 - 340	100.0	6.57

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION FLASH POINT 3 F TCC LEL 0.9

RED LABEL -- Extremely Flammable, Flash below 21 F

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, and open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Continued on page 2

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait. Irritant to skin and upper respiratory system.

CHRONIC: Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

If on SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.

If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

If SWALLOWED: Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give several glasses of water. Seek medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Continued on page 3

Office Use Only
Registration Number 35013

PART III. WASTE CHARACTERISTICS AND HANDLING PRACTICES - CONTINUED

Complete this page for each waste you generate. Space is provided on this form for two wastes. Copy this form as needed if you generate more than two wastes.

Line Action: 3 1 A (20–23)

Sequence Number — Waste No. 003 (27) of 6

Number each waste sequentially starting with 001, 002, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

9 1 6 5 0 90 (31) OFFICE USE ONLY 1 2 C (38)

Verbal description of the waste

Paint Polane B (non leaded)

Describe the process from which the waste is generated

Used in spray painting applications mixed with Lacquer Thinner and Reducer

Waste components—chemical compositions and amount (in % or mg/l) of each

See MSDS (attached) Section II

Amount generated per month

10 Kg

Texas regulations require generators to make a proper Hazardous Waste Determination (31 TAC 335.62). The definition of hazardous waste is in 40 CFR Part 261.3. Is the waste described above a hazardous waste? ☑ yes ☐ no. If hazardous, list applicable hazardous waste numbers as found in 40 CFR Part 261.

3 1 A (20–23) U220 (42) U239 (49) U165 (56) U159 (63) U057 (70) (77) (84)

Physical state (check one) ☐ solid ☑ liquid; ☐ semi solid or sludge; _____ % solids

Toxicity information (if available)

Provide details below

☑ ignitability ☐ corrosivity ☐ odor ☐ other

Flash Point: 37.65 F PMCC LEL 0.7 (MSDS Section IV)

Waste Handling Practices Check all categories that describe how this waste is handled. For example, if this waste is temporarily stored on-site then sent off-site for disposal check both on-site and off-site.

☑ ***on-site***—For *hazardous* waste, on-site storage, processing, or disposal is defined in 31 TAC 335.42. For *non-hazardous* waste, on-site is defined in 31 TAC 335.1. *Complete the Facility Information sheet (p. 7) if you check this box.*

☑ ***off-site***—Any storage, treatment or disposal of waste which is not characterized as on-site.

Number of off-site shipments per year: 2

☐ ***sanitary sewer***—Waste is sent to a publicly-owned treatment work.

☐ ***off-site via pipeline***—Waste is piped off the generation site property by pipeline.

☐ ***other***—Describe any handling of your waste not described by the above categories _____

HMN 407 409 412

F63-B Series

MATERIAL SAFETY DATA SHEET

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURR'S NAME — EMERGENCY TELEPHONE NO.

THE SHERWIN-WILLIAMS COMPANY — (216) 566-2917

101 Prospect Avenue N.W.

Cleveland, Ohio 44115

DATE OF PREPARATION — INFORMATION TELEPHONE NO.

17-Apr-85 — (216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NAME

FOLANE* B Polyurethane Coating, Non-Lead Colors

PRODUCT NUMBERS AND COLORS

F63 A 13	78 Gray	F63 L 14	Spectro Blue
F63 A 31	ASA 061 Gray	F63 L 16	Circuit Blue
F63 B 13	Static Black	F63 R 12	Thermal Red
F63 G 18	Vista Green	F63 S 1	Ultrasonic Chrome
F63 S 10	Computer Beige	F63 W 13	Strobe White
F63 S 11	Modular Ivory		

407 409 412

--- Also Non-Lead FOLANE* B Custom Colors ---

PRODUCT CLASS

Pigmented component for 2-package Polyurethane Coating

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
64742-47-8	Mineral Spirits.	0-5	100.	581.	1.0	2.0
108-88-3	Toluene.	5-10	100.	375.	1.0	22.0
1330-20-7	Xylene.	0-5	100.	435.	1.0	5.9
64742-95-6	Light Aromatic Naphtha	0-5	100.	467.	0.7	3.8
78-93-3	Methyl Ethyl Ketone.	5-20	200.	590.	1.8	70.0
108-94-1	Cyclohexanone	10-20	25.	100.	1.1	2.0
108-21-4	Isopropyl Acetate.	0-15	250.	950.	1.7	47.5
123-86-4	n-Butyl Acetate.	10-25	150.	710.	1.3	10.0

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether — VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
174 - 395	66-75	8.0-10.4

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION — FLASH POINT 37-65 F PMCC — LEL 0.7

RED LABEL -- Flammable, Flash below 100 F

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, and open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

Continued on page 2

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure r result in lightheadedness and staggering gait.
Irritant to skin. May cause lung irritation and allergic reaction.

CHRONIC: Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.
May cause lung irritation and allergic respiratory reaction.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED: If any breathing problems occur during use, LEAVE THE AREA and get fresh air. If problems remain or occur later, IMMEDIATELY get medical attentic

If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

INCOMPATIBILITY

Metallics contain Aluminum. Contamination with Water, Acids, or Alkalis can cause evo of hydrogen, which may result in dangerously increased pressures in closed containers.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide, Hydrogen Chloride

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE

NO PERSON SHOULD USE THIS PRODUCT, OR BE IN THE AREA WHERE IT IS BEING USED, IF THEY H/ CHRONIC (LONG-TERM) LUNG OR BREATHING PROBLEMS OR IF THEY EVER HAD A REACTION TO ISOCYANA

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid cont with skin and eyes. Wash hands after using.

Protect against dust which may be generated by sanding or abrading the dried film.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910. 1910.107, 1910.108.

Continued on page 3

RESPIRATORY PROTECTION

Where overspray is present, a positive air supplied respirator (TC19C NIOSH/MSHA) is recommended. If unavailable, wear a vapor/particulate respirator which respirator manufacturer recommends as effective for isocyanate vapor or mist. Follow directions for respirator use. Wear the respirator for the whole time of spraying and until all vapors and mists are gone. NO PERSONS SHOULD BE ALLOWED IN THE AREA WHERE THIS PRODUCT IS BEING USED UNLESS EQUIPPED WITH THE SAME RESPIRATORY PROTECTION RECOMMENDED FOR THE PAINTERS.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS

DOL STORAGE CATEGORY -- 1B

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS

This coating contains materials classified as nuisance particulates, for example titanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), which may be present at hazardous levels only during sanding or abrading of the dried film.

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Office Use Only
Registration Number

PART III. WASTE CHARACTERISTICS AND HANDLING PRACTICES - CONTINUED

Complete this page for each waste you generate. Space is provided on this form for two wastes. Copy this form as needed if you generate more than two wastes.

Line Action: 3 1 A (20–23)

Sequence Number: Waste No. 0041 (27) of 62

Number each waste sequentially starting with 001, 002, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

OFFICE USE ONLY (31–38)

Verbal description of the waste: Paint Reducer

Describe the process from which the waste is generated: Used in Spray Painting application

Waste components--chemical compositions and amount (in % or mg/l) of each: Naptha - 100%

Amount generated per month: 30 Kg.

Texas regulations require generators to make a proper Hazardous Waste Determination (31 TAC 335.62). The definition of hazardous waste is in 40 CFR Part 261.3. Is the waste described above a hazardous waste? ☐ yes ☐ no. If hazardous, list applicable hazardous waste numbers as found in 40 CFR Part 261.

3 1 A (20–23) U165 (42–49)

Physical state (check one) ☐ solid ☑ liquid; ☐ semi solid or sludge: _____ % solids

Toxicity information (if available)

☑ ignitability ☐ corrosivity ☐ odor ☐ other

Provide details below: Flash Point: 50 F TCC LEL 0.9 (MSDS Section IV)

Waste Handling Practices — Check all categories that describe how this waste is handled. For example, if this waste is temporarily stored on-site then sent off-site for disposal check both on-site and off-site.

☑ ***on-site***—For *hazardous* waste, on-site storage, processing, or disposal is defined in 31 TAC 335.42. For *non-hazardous* waste, on-site is defined in 31 TAC 335.1. *Complete the Facility Information sheet (p. 7) if you check this box.*

☑ ***off-site***—Any storage, treatment or disposal of waste which is not characterized as on-site.

Number of off-site shipments per year: 2

☐ ***sanitary sewer***—Waste is sent to a publicly-owned treatment work.

☐ ***off-site via pipeline***—Waste is piped off the generation site property by pipeline.

☐ ***other***—Describe any handling of your waste not described by the above categories _____

R1 R 3

5

MATERIAL SAFETY DATA SHEET

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, Ohio 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
3-May-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NUMBER
R1 R 3

* - Trade Mark

PRODUCT NAME
Paint Reducer, VM & P Naphtha

PRODUCT CLASS
Reducer

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
64742-48-9	V. M. & P. Naphtha.	100	300.	1350.	0.9	12.0

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slover than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
240 - 325	100.0	6.20

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION FLASH POINT 50 F TCC LEL 0.9

RED LABEL -- Flammable, Flash below 100 F

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, and open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Continued on page 2

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait. Irritant to skin and upper respiratory system.

CHRONIC: Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

If on SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.

If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

If SWALLOWED: Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give several glasses of water. Seek medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Continued on page 3

12

Paint Red

Office Use Only
Registration Number
[ ]

PART III. WASTE CHARACTERISTICS AND HANDLING PRACTICES - CONTINUED

Complete this page for each waste you generate. Space is provided on this form for two wastes. Copy this form as needed if you generate more than two wastes.

Line Action [3][1][ ][A] (20–23)

Waste No. Sequence Number [0][0][5] (27) of 6

Number each waste sequentially starting with 001, 002, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

[9][1][0][6][5][0][GD] (31) OFFICE USE ONLY [1][2][C] (38)

Verbal description of the waste	Describe the process from which the waste is generated
Paint - Enamel, lead colors	Used in spray painting application
Waste components—chemical compositions and amount (in % or mg/l) of each	**Amount generated per month**
See MSDS (attached)	10 Kg

Texas regulations require generators to make a proper Hazardous Waste Determination (31 TAC 335.62). The definition of hazardous waste is in 40 CFR Part 261.3. Is the waste described above a hazardous waste? ☑ yes ☐ no. If hazardous, list applicable hazardous waste numbers as found in 40 CFR Part 261.

[3][1][ ][A] (20–23) [D][0][0][8] (42–49) [D][0][0][7] (49–56) [ ] (56–63) [ ] (63–70) [ ] (70–77) [ ] (77–84)

Physical state (check one) ☐ solid ☑ liquid; ☐ semi solid or sludge: _____ % solids

Toxicity information (if available)

Provide details below

☑ ignitability ☐ corrosivity ☐ odor ☐ other

Flash Point 101 PMCC LEL 1.0

Waste Handling Practices Check all categories that describe how this waste is handled. For example, if this waste is temporarily stored on-site then sent off-site for disposal check both on-site and off-site.

☑ ***on-site***—For *hazardous* waste, on-site storage, processing, or disposal is defined in 31 TAC 335.42. For *non-hazardous* waste, on-site is defined in 31 TAC 335.1. *Complete the Facility Information sheet (p. 7) if you check this box.*

☑ ***off-site***—Any storage, treatment or disposal of waste which is not characterized as on-site.

Number of off-site shipments per year: 2

☐ ***sanitary sewer***—Waste is sent to a publicly-owned treatment work.

☐ ***off-site via pipeline***—Waste is piped off the generation site property by pipeline.

☐ ***other***—Describe any handling of your waste not described by the above categories _____

B54-Pb Series

MATERIAL SAFETY DATA SHEET

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, Ohio 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
10-May-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NAME
Industrial Enamel, Lead Colors

PRODUCT NUMBERS AND COLORS
B54 E 19 OSHA Orange
B54 R 18 OSHA Red
B54 Y 17 OSHA Yellow

PRODUCT CLASS
Alkyd Enamel

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT		PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
64742-47-8	Mineral Spirits.		40	100.	581.	1.0	2.0
7758-97-6	Lead Chromate.	and/or	<15		0.05		
12656-85-8	Molybdate Orange.				0.05		
	Lead (as Pb)		6.3-11.3		0.05		
	Chromium VI (as Cr)		1.2-2.8		0.05		

For specific percent hazardous ingredients in each product, see Section X

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
300 - 395	57	8.9-9.4

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION FLASH POINT 101 F PMCC LEL 1.0
Combustible, Flash above 99 and below 200 F

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, and open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Continued on page 2

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE
ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.
CHRONIC: Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.
Repeated and prolonged exposure to spray mist may cause perforation of nasal septum and ulcers of the skin.

EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide, Oxides of Metals in Section II

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE
Before initial use, consult OSHA's Standard for Occupational Exposure to Lead (29 CFR 1910.1025).
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
Protect against hazardous dust or fumes which may be generated by sanding, wirebrushing, abrading, burning, brazing or welding of the dried film.

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II.

PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Continued on page 3

Office Use Only
Registration Number

PART III. WASTE CHARACTERISTICS AND HANDLING PRACTICES - CONTINUED

Complete this page for each waste you generate. Space is provided on this form for two wastes. Copy this form as needed if you generate more than two wastes.

Line Action: 3 1 A (20–23)

Sequence Number: Waste No. 002 of 06 (27)

Same as 003

Number each waste sequentially starting with 001, 002, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

OFFICE USE ONLY (31–38)

Verbal description of the waste: Paint Reducer - Pdane"

Describe the process from which the waste is generated: Used in Spray Painting applications mixed in waste # 003

Waste components—chemical compositions and amount (in % or mg/l) of each: See MSDS (Attached) Section II

Amount generated per month: 30. Kg.

Texas regulations require generators to make a proper Hazardous Waste Determination (31 TAC 335.62). The definition of hazardous waste is in 40 CFR Part 261.3. Is the waste described above a hazardous waste? ☐ yes ☐ no. If hazardous, list applicable hazardous waste numbers as found in 40 CFR Part 261.

3 1 A (20–23) U220 U239 U161 (42–84)

Physical state (check one) ☐ solid ☑ liquid ☐ semi solid or sludge: _____ % solids

Toxicity information (if available)

☑ ignitability ☐ corrosivity ☐ odor ☐ other

Provide details below: Flash Point: 35 F TCC LEL 1.0

Waste Handling Practices Check all categories that describe how this waste is handled. For example, if this waste is temporarily stored on-site then sent off-site for disposal check both on-site and off-site.

☑ ***on-site***—For *hazardous* waste, on-site storage, processing, or disposal is defined in 31 TAC 335.42. For *non-hazardous* waste, on-site is defined in 31 TAC 335.1. *Complete the Facility Information sheet (p. 7) if you check this box.*

☑ ***off-site***—Any storage, treatment or disposal of waste which is not characterized as on-site.

Number of off-site shipments per year: 2

☐ ***sanitary sewer***—Waste is sent to a publicly-owned treatment work.

☐ ***off-site via pipeline***—Waste is piped off the generation site property by pipeline.

☐ ***other***—Describe any handling of your waste not described by the above categories _____

R7 K69 Reducer

HMIS 46

R7 K 69

9

MATERIAL SAFETY DATA SHEET

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, Ohio 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
15-Apr-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NUMBER
R7 K 69

* - Trade Mark

PRODUCT NAME
POLANE* Reducer

PRODUCT CLASS
Reducer

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
108-88-3	Toluene.	15	100.	375.	1.0	22.0
100-41-4	Ethylbenzene	<5	100.	435.	1.0	7.1
1330-20-7	Xylene.	60	100.	435.	1.0	5.9
108-10-1	Methyl Isobutyl Ketone.	25	50.	205.	1.4	16.0

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
222 - 289	100.0	7.04

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION FLASH POINT 35 F TCC LEL 1.0
RED LABEL -- Flammable, Flash below 100 F

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Keep containers tightly closed. Isolate from heat, electrical equipment, sparks, and open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Continued on page 2

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE
ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure a result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.
CHRONIC: Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and qui
If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.
If SWALLOWED: Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give several glasses of water. Seek medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contr with skin and eyes. Wash hands after using.

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.9 1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by MIOSH/NSHA for protection against materials in Section II.

PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials i Section II.

EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Continued on page 3

Section IX -- PRECAUTIONS

DOL STORAGE CATEGORY -- 1B

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

PART IV. ON-SITE WASTE MANAGEMENT FACILITY CHARACTERISTICS - CONTINUED

Complete this page if you checked "on-site" in Part III. Complete this sheet for each on-site facility. Copy this form as needed if you have more than two facilities. Refer to the attached tables for the proper codes to use when completing this page.

Sequence Number

Facility No. 01 of 01 (total no. of facilities)

Number each facility sequentially starting with 01, 02, etc. and enter this number under Sequence Number. See page 9 for further explanation of sequence numbers.

Office Use Only
Registration No. 38093

	Facility Type	Facility Use	Date Opened‡	Date Inactive	Surface Area in Acres (if applicable)
21A	75	1	0787		
	See Table 2 (page 11)	See Table 3 (page 11)	Month Yr.	Month Yr.	

Capacity

Waste Management Facility Description

22A MANUFACTURE, MULTIMATL

Use your own words to describe the facility

Waste Management Facility Description - Continued

EQUIPMT, MACH, VE SHOP, WELDING

Which wastes are treated, stored or disposed in this waste management facility? Enter the sequence number you assigned for each waste from Part III:

24A 001 002 003 004 005

Office Use Only

	Status	Permit No.	Permit Flag	Date Closed	Deed Flag	Date Deed Recorded
21A	A			MMYY		AMMYY

‡PLEASE NOTE—Notification to the TWC at least 90 days prior to engaging in on-site storage, processing or disposal of non-hazardous industrial solid waste is required by 31 TAC Section 335.6.

Part IV. On-Site Waste Management Facility Characteristics—Continued

Office Use Only
Registration Number
3 8 0 9 3

SEQUENCE NUMBERS

In Part III and IV you assigned a number for each waste you generate and each on-site* waste management facility you use to treat, store or dispose of your waste. Waste sequence numbers are 3 digit numbers and facility sequence numbers have 2 digits. For example, if you have two landfills, a surface impoundment and a storage container area, you would assign number 01 for one landfill, 02 for the other landfill, 03 for the surface impoundment and 04 for the storage container area. Each waste is also assigned a number beginning with 001 and continuing using 002, 003, etc. Repeat the sequence numbers you gave each facility and waste below.

FACILITY NUMBERS

0 6 A (20–23)

01 (26–29)

(32–35) (38–41) (44–47) (50–53) (56–59)

(62–65) (68–71) (74–77) (80–83) (86–89) (92–95)

(98–101) (104–107) (110–113) (116–119) (122)

WASTE NUMBERS

0 7 A (20–23)

001 002 003 004 005 (27–31) (35–39) (43–47) (51–55) (59)

(63–67) (71–75) (79–83) (87–91) (95)

(99–103) (107–111) (115)

*The term "on-site" is defined on page 5.

I certify the information herein is complete and accurate to the best of my knowledge:

Signature

8-24-87
Date

REFERENCE 7

REF. 7

DW0550 TEXAS WATER COMMISSION 10-13-87
NOTICE OF REGISTRATION
SOLID WASTE MANAGEMENT

THIS IS NOT A PERMIT AND DOES NOT CONSTITUTE AUTHORIZATION OF ANY WASTE MANAGEMENT ACTIVITIES OR FACILITIES LISTED BELOW. REQUIREMENTS FOR SOLID WASTE MANAGEMENT ARE PROVIDED BY TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TEXAS WATER COMMISSION (TWC). CHANGES OR ADDITIONS TO WASTE MANAGEMENT METHODS REFERRED TO IN THIS NOTICE REQUIRE WRITTEN NOTIFICATION TO THE TWC.

DATE OF NOTICE: 09-25-87 REGISTRATION DATE: 08-21-87

REGISTRATION NUMBER: 38093 EPA I.D. NUMBER: TXD028627438

THE REGISTRATION NUMBER PROVIDES ACCESS TO STORED INFORMATION PERTAINING TO YOUR OPERATION. PLEASE REFER TO THAT NUMBER IN ANY CORRESPONDENCE.

COMPANY NAME: FARED ROBOT SYSTEMS INC
PO BOX 185579
FORT WORTH TX 76181-5579
GENERATING SITE LOCATION:
7410 PEBBLE DRIVE FORT WORTH TX
CONTACT PERSON: DAVID YARBROUGH
PHONE: (817) 284-3401
NUMBER OF EMPLOYEES: LESS THAN 100
TWC DISTRICT: 04

REGISTRATION STATUS: ACTIVE
REGISTRATION TYPE: GENERATOR
HAZARDOUS WASTE STATUS:
SMALL QUANTITY GENERATOR

I. WASTE GENERATED:

WASTE NUMBER	DESCRIPTION	CLASS	CODE	DISPOSITION
001	METHYL ETHYL KETONE	IH	910050	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): U159			
002	LACQUER THINNER	IH	914960	ON-SITE/OFF-SITE
	EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): U220 (Toluene), U239 (Dimethyl Benzene), U154 (Methyl Alcohol), U002 (Acetone)			
003	PAINT WASTES, LIQUID	IH	910650	ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): U220, U239, U165, U159, U057 (Naphthalene, Cyclohexanone)

004 NAPHTHA IH 910020 ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): U165

005 PAINT WASTES, LIQUID IH 910650 ON-SITE/OFF-SITE

EPA HAZARDOUS WASTE NOS. (REFER TO 40 CFR PART 261 FOR DESCRIPTIONS): D008, D007 (chromium, lead)

II. SHIPPING/REPORTING: PURSUANT TO TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TWC PERTAINING TO INDUSTRIAL SOLID WASTE MANAGEMENT, ISSUANCE OF MANIFESTS AND MONTHLY REPORTING ARE REQUIRED FOR OFF-SITE STORAGE/PROCESSING/DISPOSAL OF THE FOLLOWING CLASS I WASTES LISTED IN PART I. A SHIPMENT SUMMARY REPORT SHOULD BE SUBMITTED FOR EACH MONTH NOT LATER THAN THE 25TH OF THE FOLLOWING MONTH.

001 910050 METHYL ETHYL KETONE

002 914960 LACQUER THINNER

003 910650 PAINT WASTES, LIQUID

004 910020 NAPHTHA

005 910650 PAINT WASTES, LIQUID

III. ON-SITE WASTE MANAGEMENT FACILITIES:

FAC NO.	FACILITY	STATUS
01	MISCELLANEOUS STORAGE CONTAINERS	ACTIVE

STORAGE
OF WASTE NUMBER(S) 001, 002, 003, 004, 005
MANUFACTURE,AUTOMATED EQUIPMENT,MACHINE SHOP, WELDING

UNLESS OTHERWISE STATED ABOVE, FACILITIES ARE LOCATED
AT 7410 PEBBLE DRIVE FORT WORTH TX
COUNTY OF TARRANT

IV. RECORDS.

A. FOR PURPOSES OF FILING ANNUAL REPORTS PURSUANT TO TEXAS ADMINISTRATIVE CODE SECTION 335 OF THE RULES OF THE TWC PERTAINING TO INDUSTRIAL SOLID WASTE MANAGEMENT, RECORDS SHOULD BE MAINTAINED FOR STORAGE, PROCESSING AND/OR DISPOSAL OF THE FOLLOWING WASTE(S) LISTED IN PART I:

001 910050 METHYL ETHYL KETONE

002 914960 LACQUER THINNER

003 910650 PAINT WASTES, LIQUID

004 910020 NAPHTHA

005 910650 PAINT WASTES, LIQUID

REFERENCE 8

TEXAS
WATER
DEVELOPMENT
BOARD

Report 198

WATER-LEVEL AND WATER-QUALITY DATA FROM OBSERVATION WELLS IN NORTHEAST TEXAS

As previously stated, the water table is declining by as much as 7 feet (2 m) per year, reflecting the fact that more water is removed annually from the Antlers than is recharged. With the large saturated sand thicknesses available and proper use of well construction and spacing, no problems seem likely in the immediate future as far as Antlers ground-water availability is concerned.

According to Baker (1960, p. 65), the amount of fresh-water sand decreases northward in Grayson County, chiefly as a result of increasing amounts of salt water in the northern part of the county. The lower part of the Antlers contains saline water in the vicinity of the Preston anticline; therefore, the upper part of the Antlers or the Woodbine should be developed for ground water in this area.

Twin Mountains Formation

The Twin Mountains provides moderate to large quantities of fresh to slightly saline water to wells in nine of the twenty counties included in this study. The outcrop covers approximately 370 square miles (958 km^2) and lies within Hood, Parker, and Wise Counties. As illustrated on the geologic map (Figure 16), this basal Cretaceous aquifer forms the western boundary of this study. Data on the Twin Mountains were obtained primarily through the inventory of over 600 public supply, industrial, and irrigation wells located in the study area.

The primary source of ground water in the Twin Mountains is precipitation falling on the outcrop. Other minor sources include surface-water seepage from ponds, lakes, and streams cutting the outcrop. The average annual precipitation is about 30 inches (76 cm). However, probably less than 1 inch (2.5 cm) per year is available for recharge.

Ground water in the Twin Mountains usually occurs under water-table conditions in or near the outcrop, while ground water downdip from the outcrop is under artesian conditions. The lower sands and shales of the Twin Mountains are the hydrologic equivalent of the basal portion of the Antlers. Water-level maps for the Antlers and the Twin Mountains Formations have been combined and are shown on Figures 24, 25 and 28.

The average rate of movement of water in the Twin Mountains is estimated to be less than 2 feet (1 m) per year. Ground water moves slowly downdip in an easterly direction except for local changes. Water-level measurements indicate the present hydraulic gradient is extremely variable due to the large cone of depression surrounding the Dallas-Fort Worth metroplex, but in areas beyond this influence, a gradient of approximately 22 feet per mile (4.2 m/km) is average. Altitudes of water levels about 1955 and about 1976 are shown on Figures 24 and 25.

Water is discharged naturally from the Twin Mountains by springs and evapotranspiration and artificially by pumpage. In 1976, over 40,000 acre-feet (49.3 hm^3) of ground water was pumped from the Twin Mountains in the study area.

The coefficients of transmissibility, permeability, and storage for the Twin Mountains Formation are shown in Table 4. This table was compiled from existing literature and from data supplied by well drillers. Transmissibility and permeability values are also represented graphically on Figure 26. Permeability coefficients were computed by dividing the transmissibility of the well by its screened interval. Aquifer test results on 58 Twin Mountains wells were analyzed.

Review of the test results, illustrated on Figure 26, show that transmissibility values are generally higher in the central, northern, and eastern sections of the study area. The range of transmissibility was 1,950 to 29,700 (gal/d)/ft, or 24,200 to 369,000 (l/d)/m. The average for tests in Dallas County was 12,700 (gal/d)/ft, or 158,100 (l/d)/m; tests in Tarrant County was 8,450 (gal/d)/ft, or 105,000 (l/d)/m; and tests in the Johnson-Ellis County area was 6,480 (gal/d)/ft, or 80,500 (l/d)/m. Permeability values ranged from 8 to 165 (gal/d)/ft^2, or 326 to 6,720 (l/d)/m^2, with an average value of 68 (gal/d)/ft^2, or 2,770 (l/d)/m^2. Storage coefficients were obtained from 14 tests and ranged from 5×10^{-4} to 4×10^{-5} with an average value of 1×10^{-4}, or 0.0001. The specific yield in the outcrop is on the order of 15 percent as estimated by seismic methods (Duffin and Elder, 1979).

Yields of wells completed in the Twin Mountains range from 10 to 1,940 gallons per minute (gal/min) (0.63 to 122 l/s), with an average yield of 286 gal/min (18 l/s) for the 525 wells measured. Yields were considerably lower on or near the outcrop than yields of wells further downdip. Well yields generally increase from the southern part of the study area to the northern part. Both Collin and Dallas Counties have average well yields in excess of 700 gal/min, (44 l/s), while Hood, Parker, and Wise Counties average less than 100 gal/min (6.3 l/s). Denton, Ellis, and Tarrant Counties each average about 300 gal/min (19 l/s). Since many of the wells measured were of small capacity, improperly developed, or did not penetrate the full thickness of the aquifer, well yields are probably greater than the stated averages.

Specific capacities of 233 wells screened in the Twin Mountains range from 0.3 to 12.2 (gal/min)/ft, or 0.06 to 2.53 (l/s)/m, and averaged 3.3 (gal/min)/ft, or 0.68 (l/s)/m. Specific capacities are generally higher in the northern and eastern parts of the study area.

Wells completed in the Twin Mountains outcrop have not experienced water-level declines other than the normal seasonal fluctuations. Water levels in wells east of the outcrop are declining steadily. The changes in water levels are illustrated on Figure 28 and by hydrographs (Figures 7 and 8). Long-range declines average over 20 feet (6 m) per year in eastern Tarrant and western Dallas Counties, corresponding to the center of the cone of depression as illustrated by the water-level maps (Figures 24 and 25). In areas outside this influence, water levels are declining 9 (3 m) to 17 (5 m) feet annually.

The large cone of depression depicted on Figure 25 is centered in the area between Euless in Tarrant County and Grand Prairie in Dallas County. Static water levels in several wells have reached the 1,000 foot (305 m) level and pumps are set as low as 1,500 feet (457 m) below the land surface. Yields have diminished and pumping-lift costs have risen. Lowering of pumps is a common occurrence. Several large ground-water users in this area, namely Euless, Bedford, and Arlington, have changed to surface-water supplies. This resultant decrease in pumpage may help alleviate the water-level declines now being experienced.

Wells which are not in the immediate vicinity of the cone of depression have also experienced large annual declines. A well at Everman in Tarrant County, had a water-level decline of 530 feet (162 m) over a 26-year period. The level in a well at Lancaster in Dallas County, declined 362 feet (110 m) in a 23-year period, and at Flower Mound in Denton County, a decline of 160 feet (49 m) in less than 9 years has occurred. Water-level declines are commonplace and are about average over most of the study area.

About half the ground water from the Woodbine and Trinity Group aquifers, over 40,000 acre-feet (49.3 hm^3), was pumped from the Twin Mountains in 1976. Public-supply use accounted for over 31,000 acre-feet (38.2 hm^3), more than the total public-supply use for all other aquifers in the study area combined. Almost all municipal, industrial, and irrigation wells were inventoried for this study. Data on 613 wells were tabulated and compiled within the record of wells. In areas where no large capacity wells exist, livestock or domestic wells were inventoried to provide more complete coverage. The estimated amount of ground water pumped from the Twin Mountains is shown in Tables 5 and 9. Domestic wells pumped an estimated 1,200 acre-feet (1.48 hm^3) of water from the Twin Mountains in 1975.

Public-supply wells accounted for 31,120 acre-feet (38.4 hm^3) of water from the Twin Mountains in 1976. This amount is double the quantity pumped in 1960. The greatest amount pumped during a single year was 32,468 acre-feet (40.0 hm^3) in 1974. Over the years, Dallas County pumpage has steadily increased, with almost 18,000 acre-feet (22.2 hm^3) pumped in 1976. Tarrant County increased each year until 1972, when Arlington, Bedford, and Euless changed to surface water. The amount of ground water pumped from the Twin Mountains in Tarrant County declined from 12,688 acre-feet (15.6 hm^3) in 1972 to only 6,080 acre-feet (7.50 hm^3) in 1976. Table 9 shows the public supply and industrial pumpage from 1955 to 1976.

Data were collected on 437 public-supply wells completed in the Twin Mountains. Of this amount, 105 are located in Tarrant County. Dallas, Denton, and Hood Counties average 70 wells each. Many of the wells inventoried in Tarrant and Dallas Counties have been abandoned. The largest individual user of ground water is Grand Prairie, pumping approximately 6,700 acre-feet (8.26 hm^3) in 1976. The four largest users are all in Dallas County, including Grand Prairie, Irving (4,812 acre-feet) (5.93 hm^3), Carrollton (2,080 acre-feet) (2.56 hm^3), and Lancaster (1,348 acre-feet) (1.66 hm^3). These four cities had a 1976 total pumpage of almost 15,000 acre-feet (18.5 hm^3), which is about half of all the ground water pumped from the Twin Mountains for public-supply purposes in the study area. Grand Prairie and Irving are both situated near the center of the cone of depression previously mentioned. When Arlington, Bedford, and Euless were operating wells, an additional 5,000 acre-feet (6.17 hm^3) of ground water was also pumped from near the center of the cone.

Use of ground water for industrial purposes has diminished over the last 12 years. As shown in Table 9, approximately 6,000 acre-feet (7.40 hm^3) was pumped in 1976, just about one-half the amount used in 1964. The inventory of wells resulted in the location of 113 industrial wells in the study area, many of which are now abandoned. About 70 percent of the industrial wells inventoried are located in Dallas and Tarrant Counties.

Ground-water irrigation constitutes only a small portion of the pumpage from the Twin Mountains. According to Table 5, approximately 1,545 acre-feet (1.90 hm^3) was pumped for irrigation purposes in 1977. Most of the water was used to irrigate golf courses and lawns. Irrigation of crops is limited to the outcrop area

in Hood, Parker, and Wise Counties. Forty-seven irrigation wells that were inventoried accounted for 16 percent of the 1977 pumpage from the Twin Mountains.

The Twin Mountains Formation is the most prolific of the Cretaceous aquifers in the study area with about 55 percent of the total quantity of ground water utilized for municipal and industrial purposes. The quality of water is generally not as good as from the Paluxy or Antlers. However, higher well-yields allow some sacrifice in chemical quality. Approximately 700 analyses of water samples from the Twin Mountains have been tabulated and included in Table 10 which shows the range of constituents and properties of the water from representative wells. About 22 percent of these analyses contained dissolved-solids concentrations in excess of 1,000 mg/l.

Similar to the other Cretaceous aquifers in this study, the ground water from wells drilled on the outcrop of the Twin Mountains is hard and contains high concentrations of dissolved iron. In the downdip area, about 9 percent of the samples contain dissolved iron concentrations in excess of the recommended limit of 0.3 mg/l, and about 83 percent of the water is soft. The maximum allowable level for fluoride in the study area is 1.6 mg/l according to Drinking Water Standards adopted by the Texas Department of Health. Over 230 analyses contained fluoride levels exceeding 1.6 mg/l. Most of the other constituent levels were close to the maximum. Therefore, the main problems related to water quality for this aquifer are excessive fluoride and dissolved-solids concentrations. The downdip limit of fresh to slightly saline water is encountered about 60 to 75 miles (97 to 121 km) east-southeast of the outcrop in the majority of the study area (Figure 25). This distance is considerably less in the northern part of the study area where the outcrop trends eastward in the vicinity of Red River.

Since there are no concentrated areas of ground-water irrigation on the Twin Mountains outcrop, not enough chemical-quality data could be obtained to present a detailed classification of irrigation waters. Generally speaking, the Twin Mountains irrigation wells that are scattered through northeastern Hood County showed a very high sodium hazard, medium to high salinity hazard, and RSC levels classified as unsuitable for irrigation. Limited use of these wells accompanied with crop rotation and good management is necessary for continued good land productivity.

Irrigation wells, located near Brock in Parker County and completed on the Twin Mountains outcrop, were sampled and the results showed a low sodium hazard, medium salinity hazard, and zero RSC. The quality of water from 30 wells was suitable for irrigation use, but well yields limited extensive development.

Figure 29 shows the net sand thickness of fresh to slightly saline water-bearing sand in the Twin Mountains. Net sand thickness generally increases downdip in an easterly direction. Thickness increases from less than 100 feet (30 m) near the outcrop to over 400 feet (122 m) near the downdip limit of fresh to slightly saline water.

Areas for future development would have to be outside the Dallas-Fort Worth metroplex cone of depression. Even outside this influence, water levels are dropping over 10 feet (3 m) per year. There are several areas where water quality restricts development of wells for irrigation use as previously noted and depicted on Figure 23. Wells tapping the Twin Mountains aquifer in areas downdip from the outcrop and in areas where quality is not a problem can expect a steady decline in water levels and yields.

Paluxy Formation

The Paluxy yields small to moderate amounts of fresh to slightly saline water to public supply, industrial, domestic and livestock wells in 16 of the 20 counties included in this study. The majority of the Paluxy outcrop occurs in Hood, Parker, Tarrant, and Wise Counties as illustrated on the geologic map (Figure 16) and occupies about 650 square miles (1,684 km^2).

The primary source of recharge to the Paluxy is precipitation on the outcrop. Secondary sources include recharge from streams flowing across the outcrop and surface-water seepage from lakes. The Brazos and Trinity River systems and Eagle Mountain Reservoir are a few examples. The average annual precipitation on the outcrop is about 31 inches (79 cm). Only a small fraction of the amount is available as effective recharge since there is much runoff and evapotranspiration.

Water in the outcrop area is under water-table conditions and water levels remain fairly constant with only normal seasonal fluctuations. In downdip areas, water is under artesian conditions, and is confined under hydrostatic pressure from overlying formations. The average rate of movement of water in the Paluxy amounts to less than 2 feet (0.6 m) per year in an easterly direction except in downdip areas of heavy pumpage where cones of depression have occurred and movement is towards the center of the pumped wells. Water-level measurements indicate that the present hydraulic gradient is approximately 27 feet per mile

(5.1 m/km). Altitudes of water levels about 1955 and about 1976 are shown on Figures 30 and 31.

Discharge from the Paluxy occurs naturally through springs and evapotranspiration and artificially through pumpage from water wells. In 1976, approximately 13,550 acre-feet (16.7 hm^3) was pumped from the Paluxy for municipal, industrial, irrigation, and domestic purposes. Livestock use would probably add several thousand acre-feet (several cubic hectometers) more to this quantity.

Table 4 shows the results of pumping tests conducted in the study area. Test results were obtained from existing literature or from data supplied by well drillers. A total of 25 Paluxy public-supply wells were tested and transmissibilities determined. Permeabilities were determined by dividing the transmissibility of the well by its screened interval. No tests were conducted on the outcrop under water-table conditions.

Transmissibility values in 25 tests range from 1,263 to 13,808 (gal/d)/ft, or 15,700 to 171,500 (l/d)/m, with an overall average of 3,700 (gal/d)/ft, or 45,900 (l/d)/m. Only three tests exceeded 6,600 (gal/d)/ft, or 82,000 (l/d)/m, while nine tests fell below 3,000 (gal/d)/ft, or 37,300 (l/d)/m. Generally, the net sand thickness increases from less than 50 feet (15 m) in the southwest portion of the study area to 190 feet (58 m) in Denton County. Coefficients of permeability at 25 well locations were highly variable. A range of 6 to 150 (gal/d)/ft^2, or 244 to 6,110 (l/d)/m^2, was encountered with an overall average of 50 (gal/d)/ft^2, or 2,040 (l/d)/m^2. Of the 18 aquifer tests conducted in Tarrant County, two transmissibilities were extremely high and probably not representative. Eliminating the two high results, the average transmissibility for 16 tests is 3,580 (gal/d)/ft, or 44,500 (l/d)/m, and the average permeability is 44 (gal/d)/ft^2, or 1,790 (l/d)/m^2. Permeabilities probably increase from the outcrop in a downdip direction and from south to north, corresponding to increasing sand thicknesses. Storage coefficients were determined at five sites, four of which are in Tarrant County. Values range from 0.00002 to 0.00034 with an average of 0.00014. This value is probably applicable to most of the study area. The specific yield in the outcrop is on the order of 15 to 20 percent as estimated by seismic methods (Duffin and Elder, 1979).

Yields of wells completed in the Paluxy ranged from 10 to 482 gal/min (0.63 to 30 l/s). A total of 344 wells were measured with an average yield of 97 gal/min (6.1 l/s). Lower yields were obtained in wells completed on or near the outcrop, while wells in downdip areas had significantly larger yields due mainly to the larger available heads. The following table lists counties that use water from the Paluxy aquifer extensively.

County	Number of Wells Measured	Average Yield (gal/min)	Number of Wells Tested	Average Specific Capacity [(gal/min)/ft]
Collin	9	132	3	2.39
Dallas	37	189	13	2.13
Denton	27	84	12	1.85
Johnson	19	68	6	1.08
Parker	21	45	13	1.35
Tarrant	214	84	95	1.56

Many of the wells do not penetrate the entire aquifer and are not designed for maximum production. Well completion techniques and pump capacities also affect production. Therefore, yields of many wells are somewhat less than the maximum yields that could be developed. Four flowing wells were measured in Red River County near the Red River and had an average yield of 300 gal/min (19 l/s). Several wells in Fannin, Lamar, Kaufman, Rockwall, and Ellis Counties were measured and yields of at least 100 gal/min (6.3 l/s) were obtained. The specific capacities of 152 wells screened in the Paluxy sand ranged from 0.3 to 5.4 (gal/min)/ft, or 0.06 to 1.1 (l/s)/m, and averaged 1.64 (gal/min)/ft, or 0.34 (l/s)/m. The specific capacities increase toward the east in a downdip direction. Variations over short distances are due mainly to well construction and to lithologic changes.

Changes in water levels of wells completed in the Paluxy aquifer are illustrated by hydrographs (Figures 7 and 9) and a water-level decline map (Figure 32) showing approximate declines in the vicinity of Dallas and Tarrant Counties from about 1955 through about 1976. There are no long-range declines in the outcrop of the Paluxy or adjacent to it. The aquifer is under water-table conditions in this region and observation wells show minor fluctuations from year to year. However, the Lake Worth-White Settlement-Benbrook area of Tarrant County lies adjacent to the outcrop and due to heavy pumpage of the Paluxy, declines of several feet (meters) per year have been observed. Substantial withdrawals of water in the Tarrant County vicinity are reflected in the large cone of depression illustrated on Figure 31. The cone is at its deepest point in the Euless area of Tarrant County where the static water level of the Paluxy declined over 350 feet (107 m) in the last 20 years. The abandonment of Paluxy public-supply wells in this area during recent years should reflect rising water levels in the near future. The steady decline exhibited throughout the study area downdip from the outcrop is a result of the low permeability of the water-bearing sands and the large amount of ground water used for public supply and domestic purposes.

Approximately 15,000 acre-feet (18.5 hm^3) of water was withdrawn from the Paluxy in 1976, which is about 17 percent of the total amount pumped from the Woodbine and Trinity Group aquifers for the year. Municipal pumpage accounted for over half of this amount while domestic use accounted for about 24 percent. An attempt was made to inventory all large-capacity Paluxy wells developed for public supply, industry, and irrigation purposes. Of the 650 wells inventoried, 480 were used for public supply, and of this amount, approximately 40 percent are no longer in use. The estimated amount of ground water pumped from the Paluxy is shown in Tables 5 and 11.

Public-supply wells pumped 8,320 acre-feet (10.3 hm^3) of ground water from the Paluxy in 1976. Development of the Paluxy, especially in Tarrant County, began at the turn of the century and by the 1950's, large quantities of water were being withdrawn. In 1955, Tarrant County used 5,628 acre-feet (6.94 hm^3) for public supply, and Dallas County pumped 1,718 acre-feet (2.12 hm^3). This accounted for 88 percent of the public-supply pumpage from the Paluxy for the year. According to Table 11, Dallas and Tarrant Counties pumped 72 percent of the ground water used for public-supply in 1976. The concentrated pumpage in these two counties has resulted in the large cone of depression located in eastern Tarrant County. Of the 480 Paluxy public-supply wells inventoried, 285 were located in Tarrant County and 105 of these have been abandoned. Many of the cities near the center of the cone of depression have abandoned Paluxy wells due to diminishing well yields and declining water levels. Pumping levels in some wells fall below the top of the screened interval. Dewatering of the aquifer in this area has been taking place for the last 25 years. Municipalities using large amounts of ground water in 1976 include the cities of Benbrook, 1,090 acre-feet (1.34 hm^3); Grand Prairie, 900 acre-feet (1.11 hm^3); Colleyville, 433 acre-feet (0.533 hm^3); and White Settlement, 420 acre-feet (0.517 hm^3). Domestic pumpage for 1976 is estimated at 3,550 acre-feet (4.38 hm^3).

Industrial use accounted for 1,365 acre-feet (1.68 hm^3) in 1976. Of the 126 Paluxy industrial wells inventoried, 80 were located in Tarrant County and pumped 643 acre-feet (0.793 hm^3) in 1976. About one-fourth of these wells are no longer used. Only 18 industrial wells were developed in Dallas County but production in 1976 amounted to 519 acre-feet (0.640 hm^3). The most ground water pumped in any one year for industrial purposes from the Paluxy was in 1973 when 2,035 acre-feet (2.51 hm^3) was withdrawn.

Only minor amounts of water for irrigation purposes are pumped from the Paluxy, with about 361 acre-feet (0.445 hm^3) used in 1977 from 44 wells. Most of these wells are located in Dallas, Parker, Red River, and Tarrant Counties. The wells are widely scattered and are primarily used for watering golf courses and greenbelt areas around industries. Four flowing wells in Red River County were inventoried; one well was flowing in excess of 400 gal/min (25 l/s).

Wells completed in the Paluxy have water with chemical quality that is generally better than water from other Cretaceous aquifers in the study area. Over 600 analyses were collected or obtained from other sources, providing an adequate chemical quality network with the exception of the northeastern area. Most of the minor deficiencies found in Paluxy water exist on or near the outcrop, where hardness and higher iron concentrations occur. Approximately 25 percent of the analyses show hardness as $CaCO_3$ exceeding the 60 mg/l level, and many exceed the 120 mg/l and 180 mg/l level. About 40 analyses had iron concentrations in excess of the recommended level of 0.3 mg/l. Only 7 percent of the analyses had more than 1,000 mg/l dissolved-solids and only 9 analyses had concentrations in excess of 2,000 mg/l. Fluoride levels increase in the downdip part of the aquifer, with most of the water exceeding 1.6 mg/l near the downdip limit of fresh to slightly saline water. Only a few water wells tap the Paluxy in Fannin, Lamar, and Red River Counties; however, they contain water of good quality. Well yields and construction costs limit Paluxy well development in this area. Table 12

shows the range of constituents and properties of water from representative wells in the Paluxy Formation.

Figure 20 shows the net sand thickness of fresh to slightly saline water-bearing sand in the Paluxy. Net sand thicknesses increase from less than 50 feet (15 m) in Johnson County to 190 feet (58 m) in Denton County. Ordinarily, the most favorable areas for development of ground water would be where the saturated sand is greatest. However, due to the heavy pumpage over the past 30 years, most areas are already overdeveloped and water levels are declining at an alarming rate. The only area that seems available for increased development would be in areas of Fannin and Lamar Counties. The six public supply wells in these counties are located in an area where water from the Woodbine is saline. Well yields in excess of 100 gal/min (6.3 l/s) with pumping levels below 300 feet (91 m) are encountered.

Any Paluxy wells developed in the area of the cone of depression in eastern Tarrant County can expect pumping levels, and in some areas static water levels, to be below the top of the aquifer. Pumps are usually set near the base of the formation. Outside this area and downdip from the outcrop, water levels are declining from 4 to 12 feet (1 to 4 m) per year. Correct spacing of wells is a prerequisite throughout the study region. Any additional development of the Paluxy will result in further lowering of the artesian head in areas where the water levels are still above the formation top. In sone areas, additional development will result in dewatering of the aquifer.

Woodbine Group

The Woodbine Group is an important aquifer in the study region. The outcrop extends in a south-north direction through the center of the report area and then trends to the east parallel to the Red River. The Woodbine dips eastward where it reaches a maximum thickness of about 700 feet (213 m) and has a maximum depth of 2,500 feet (762 m) below land surface. The areal extent of the outcrop and the approximate altitude to the top of the Woodbine are illustrated on Figure 21.

The primary source of ground water in the Woodbine is rainfall on the outcrop area. This area receives an annual rainfall of from 33 inches (84 cm) in the south to 37 inches (94 cm) in the north. Other sources of ground water include surface-water seepage from lakes and streams, such as Lake Grapevine, Garza-Little Elm Reservoir, and the Trinity River tributaries.

Water occurs in saturated sand beds under both water-table and artesian conditions. Water-table conditions occur in or near the outcrop while artesian conditions prevail downdip.

Recharge to the Woodbine occurs in the outcrop area, about 1,200 square miles (3,108 km^2), which consists of a permeable, sandy soil conductive to infiltration of rainfall and seepage from streams. The quantity of recharge to the Woodbine is estimated to be equivalent to less than one inch of precipitation per year on the sandy portion of the outcrop. The movement of water follows an east-southeast direction from the outcrop, generally paralleling the dip of the beds. According to Baker (1960), the average rate of water movement in the Woodbine is estimated to be about 15 feet per year (4.6 m/yr). The hydraulic gradient varies from over 30 feet per mile (5.7 m/km) to less than 13 feet per mile (2.5 m/km) within the study area except for minor local variations and for cones of depression around areas of excessive ground-water pumpage. The hydraulic gradient and a large cone of depression around the city of Sherman are illustrated on Figure 33, which also shows the approximate altitude of water levels in the Woodbine aquifer about 1976.

Discharge from the Woodbine occurs naturally through springs and seeps, evaporation, and transpiration by plants. Evapotranspiration is greatest in the summer and where vegetation is dense. Pumpage of wells constitutes most of the water artificially discharged from the aquifer and includes some flowing wells along the Red River portion of the outcrop. In 1976, about 20,500 acre-feet (25.3 hm^3) of ground water was pumped from the Woodbine in the region.

The coefficients of storage, permeability, and transmissibility and the specific capacity for the Woodbine are shown on Table 4. Aquifer test locations and results are shown on Figure 26. The table was compiled from existing literature and from tests conducted by water-well drillers. Data from aquifer tests were analyzed by using the modified Theis nonequilibrium formula in conjunction with a computer program which provides a means of computing transmissibility from the water-level recovery of a step-drawdown test. The permeability coefficients were computed by dividing the transmissibility by the effective sand thickness. Specific capacities of wells were determined by dividing the yield by the total water-level drawdown measured in the well.

The specific yield was estimated using seismic methods (Duffin and Elder, 1979) in the outcrop under

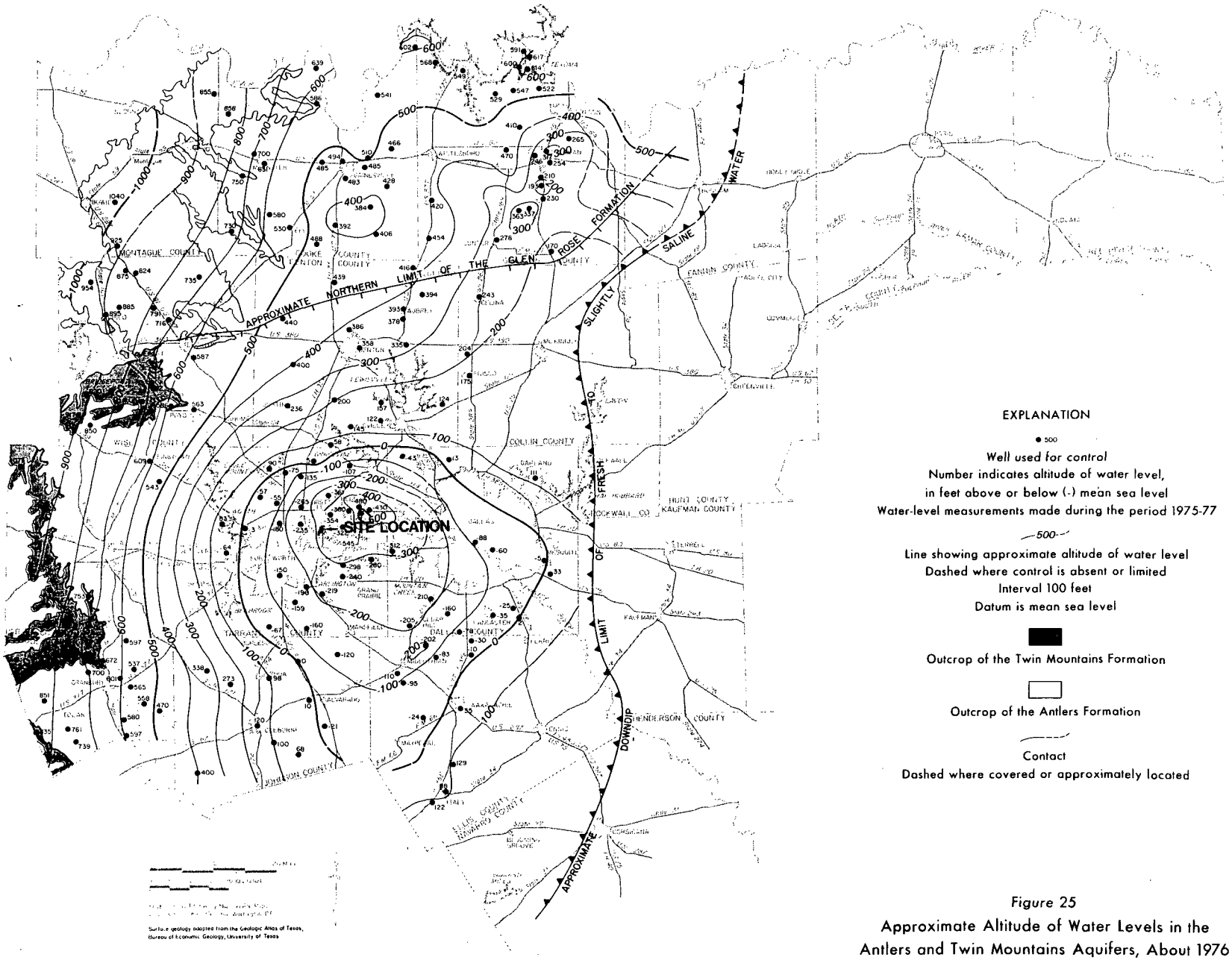

Figure 25

Approximate Altitude of Water Levels in the Antlers and Twin Mountains Aquifers, About 1976

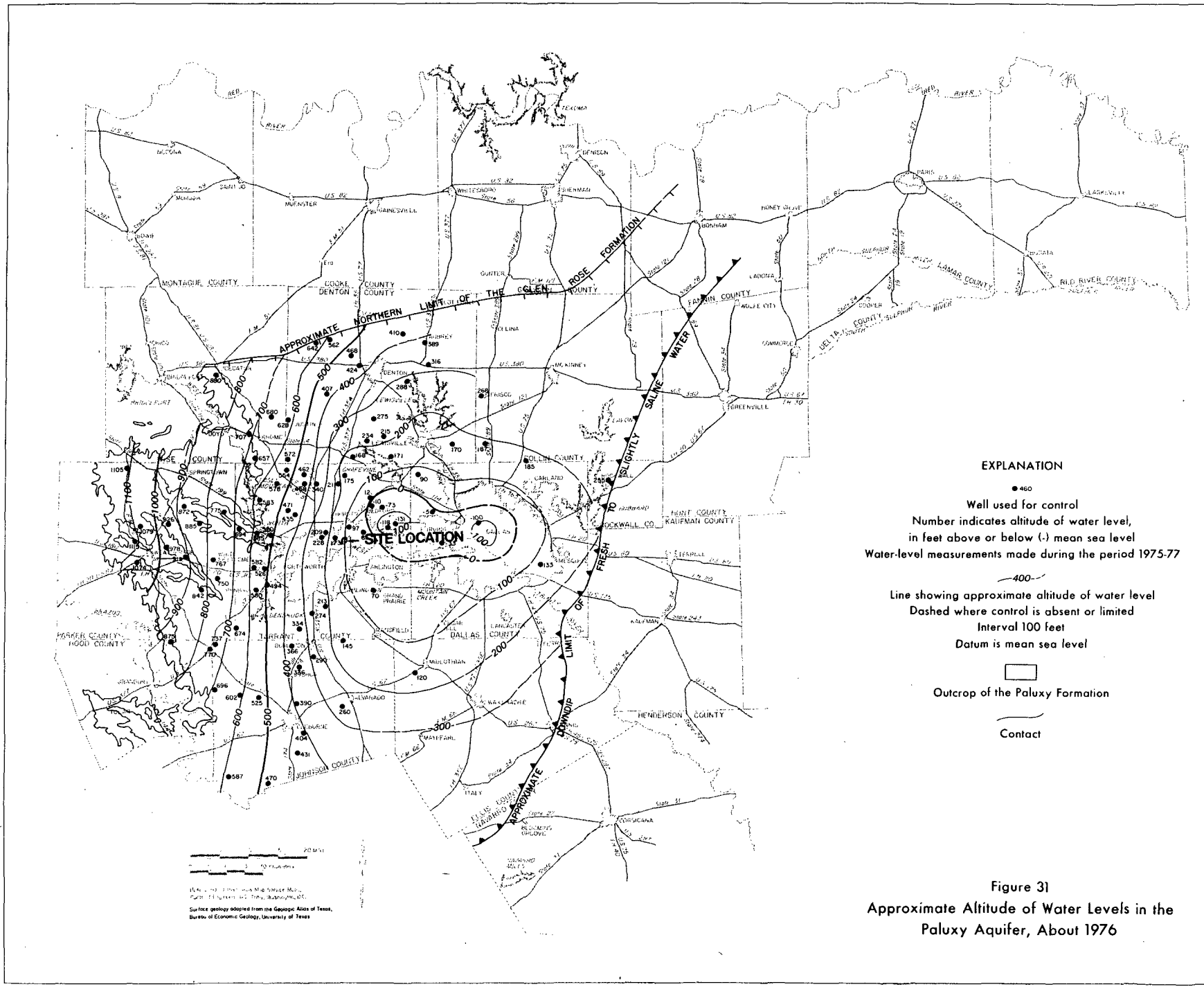

Figure 31
Approximate Altitude of Water Levels in the Paluxy Aquifer, About 1976

REFERENCE 9

Report 269

OCCURRENCE, AVAILABILITY, AND CHEMICAL QUALITY OF GROUND WATER IN THE CRETACEOUS AQUIFERS OF NORTH-CENTRAL TEXAS

Volume 1

Ref 9

TEXAS DEPARTMENT OF WATER RESOURCES

April 1982

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REPORT 269

OCCURRENCE, AVAILABILITY, AND CHEMICAL QUALITY OF GROUND WATER IN THE CRETACEOUS AQUIFERS OF NORTH-CENTRAL TEXAS

VOLUME 1

By

Phillip L. Nordstrom, Geologist

April 1982

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water-bearing formations in north-central Texas are of Cretaceous age.

The Cretaceous System is composed of two series, Gulf and Comanche, and each is divided into groups. The Gulf Series is divided into the following five groups: Navarro, Taylor, Austin, Eagle Ford, and Woodbine. The Comanche Series is divided into the following three groups: Washita, Fredericksburg, and Trinity.

The Taylor and Eagle Ford Groups consist predominantly of shale, limestone, clay, and marl and yield only small amounts of water in localized areas. The Navarro and Austin Groups consist of chalk, limestone, marl, clay, and sand and, except for the Nacatoch and Blossom Sands, yield only small amounts of water locally. The Nacatoch Sand of the Navarro Group and the Blossom Sand of the Austin Group yield small to moderate supplies of water to limited areas. The Woodbine Group is the only important aquifer of the Gulf Series in the area covered by this report. It consists of sand, sandstone, and clay and is capable of yielding small to large amounts of water. The Woodbine Group is discussed in detail in the sections covering the stratigraphy of the water-bearing formations and the occurrence and the availability of ground water.

Both the Washita and Fredericksburg Groups of the Comanche Series consist predominantly of limestone, shale, clay, and marl and yield only small amounts of water to localized areas. The Trinity Group is the principal water-bearing group of rocks in the region and is divided into the Paluxy, Glen Rose, Twin Mountains, and Antlers Formations. The Paluxy consists of sand and shale and is capable of yielding small to moderate amounts of water. The Glen Rose is predominantly a limestone and yields small quantities of water only to localized areas. The Twin Mountains is composed of conglomerate, sand, and shale. It is the principal water-bearing formation of Cretaceous age in the region and yields moderate to large amounts of water. The name Antlers Formation is applied north of the Glen Rose pinch-out, where the Paluxy and Twin Mountains coalesce to form one unit. Water-bearing members of the Trinity Group are discussed in detail in the sections covering stratigraphy of the water-bearing formations and occurrence and availability of ground water.

The relationship, approximate maximum thickness, brief description of lithology, and summary of water-bearing properties of the stratigraphic units are shown in Table 1. Outcrop areas of the various formations are illustrated on the geologic outcrop map (Figure 16). The altitude of the top of the formations and their net sand thicknesses are shown on Figures 18 through 22, 27, and 29.

Geologic cross-sections are profiles portraying an interpretation of a vertical section of the earth. Five geologic cross-sections were constructed; two are strike sections and three are dip sections. Dip sections are constructed approximately perpendicular to the strike of the beds and parallel to the dip of the beds, while strike sections are constructed parallel to the strike of the beds. These five geologic sections, illustrated on Figures 35 through 39, show the structure and stratigraphic relationships of the geologic units.

Structure

Pennsylvanian and Permian rocks in the outcrop along the west edge of the study area dip westward and northwestward at about 40 feet per mile (7.6 m/km). Permian beds probably extend not much farther eastward than Montague County. The Pennsylvanian sediments, which underlie the Cretaceous rocks in most of the remaining area, thicken from the outcrop eastward into the Fort Worth basin. The axis of this basin and many of the other major structural features in or near the report area are shown on Figure 4.

The Cretaceous System forms a southeastward-thickening wedge extending across the area into a structural feature known as the East Texas basin. Thickness of these rocks ranges from zero in the west to nearly 7,500 feet (2,286 m) in the southeast. Regional dip is east and southeast at rates of about 15 to 40 feet per mile (2.8 to 7.6 m/km). The dip rate increases to as much as 300 feet per mile (57 m/km) on the southeastward-plunging ridge called the Preston anticline. This anticline and an associated trough to the south (Sherman syncline) have caused a change in the regional outcrop pattern as shown on the geologic map (Figure 16).

Tertiary System beds dip regionally southeastward from the Mexia-Talco fault system, which extends in a northerly direction along the eastern margin of the report area, at a rate of about 100 feet per mile (19 m/km). Deviations from this dip rate occur locally due to the faulting. These beds attain a thickness of approximately 250 feet (76 m) within the area of study. However, just outside the area of investigation in southern Navarro County they reach a maximum thickness in excess of 1,000 feet (305 m).

Quarternary deposits occur along the floodplains of the Brazos, Red, Sulphur, and Trinity Rivers and

silty clays, and siliceous conglomerates of chert, quartzite, and quartz pebbles.

The Twin Mountains consists of a basal conglomerate of chert and quartz, grading upward into coarse- to fine-grained sand interspersed with varicolored shale. The sand strata are more thickly bedded in the lower part of the formation than in the upper and middle and can be correlated to the Hosston Formation to the south. It is in this lower massive sand that the majority of wells are completed. Varicolored shale and clay, predominantly red, occur throughout the formation. The shale grades vertically and laterally into sandy shale and sand, making correlations over long distances almost impossible. The upper part of the Twin Mountains also contains a considerable percentage of sand and sandstone strata but less than the lower part due to the increased interbedding of shale and clay. Few wells are developed in the upper part of the formation.

Beds dip toward the east from 30 feet per mile (5.7 m/km) near the outcrop to 95 feet per mile (18 m/km) near the downdip limit of fresh to slightly saline water as illustrated on the geologic cross sections and Figure 19 which shows the approximate altitude of the top of the Twin Mountains. Thickness varies considerably over the study region, generally increasing downdip and ranging from less than 200 feet (61 m) near the outcrop to 860 feet (262 m) in oil test HR-33-28-401. However, data on cross section C-C' (Figure 37) indicate that maximum thickness at the downdip limit of fresh to slightly saline water should reach approximately 1,000 feet (305 m).

The Twin Mountains Formation is the most important source of ground water for a large part of the study region and yields moderate to large quantities of fresh to slightly saline water to municipal and industrial wells. In 1974, over 41,000 acre-feet (50.6 hm^3) of water was pumped from this aquifer for municipal and industrial uses.

Paluxy Formation

The Paluxy Formation is the upper member of the Trinity Group south of the Glen Rose pinch-out. It crops out in Hood, Parker, Tarrant, and Wise Counties and forms the surface of the Western Cross Timbers belt. The dip is easterly at an average rate of 30 feet per mile (5.7 m/km) near the outcrop, increasing to 80 feet per mile (15.2 m/km) near the downdip limit of fresh to slightly saline water as illustrated on the geologic sections and on Figure 18, which shows the approximate altitude of the top of the Paluxy and the extent of the outcrop in the study area.

The Paluxy is composed predominantly of fine- to coarse-grained, friable, homogeneous, white quartz sand interbedded with sandy, silty, calcareous, or waxy clay and shale. In general, coarse-grained sand is in the lower part. The Paluxy grades upward into fine-grained sand with variable amounts of shale and clay. The sands are usually well sorted, poorly cemented, and crossbedded. Pyrite and iron nodules are often associated with the sands and frequently contribute a red stain to the individual beds. In some areas along the outcrop, high iron concentrations are present in ground-water analyses.

Thickness of the Paluxy varies considerably throughout the study region. From a maximum thickness nearing 400 feet (122 m) in the northern part of the study area, the Paluxy thins to the south and southeast to less than 100 feet (30 m) with a net sand thickness of less than 40 feet (12 m). This thickness change is shown on the geologic sections and on Figure 20, which shows the approximate net thickness of sand and the downdip limit of fresh to slightly saline water.

The Paluxy Formation is an important aquifer in the study region and during 1974, produced over 10,000 acre-feet (12.3 hm^3) of water for municipal and industrial use and provided water to many domestic and livestock wells. Water wells tapping the Paluxy aquifer yield small to moderate quantities of fresh to slightly saline water.

Woodbine Group

The Woodbine Group is the basal rock unit of the Gulf Series of Cretaceous age in the study area. It crops out in Cooke, Dallas, Denton, Grayson, Johnson, and Tarrant Counties with a northeast-southwest strike. In the northern part of Texas, the outcrop parallels the Red River in a west-east strike, cropping out in Fannin, Lamar, and Red River Counties (Figure 16). The regional dip is to the southeast at an average rate of 35 feet per mile (6.63 m/km) near the outcrop and up to 75 feet per mile (14.2 m/km) near the downdip limit of fresh to slightly saline water as illustrated on the geologic sections and on Figure 21, which shows the approximate altitude of the top of the Woodbine.

In the southern part of the study area, the Woodbine is composed of friable, ferruginous, fine-grained sand and sandstone with interbedded shale, sandy shale, and laminated clay. The upper part of the Woodbine displays a marked increase in shale and clay, while the lower portion exhibits a more sandy make-up. Ripple marks and large-scale crossbedding are prevalent throughout the entire Woodbine Group.

REFERENCE 10

RECORD OF COMMUNICATION

Reference 10

TYPE: Telephone Call **DATE:** 11-19-90 **TIME:** 2:20 p.m.

TO: Mike Jones
Engineer
Fort Worth Water Dept.
(817) 871-8240

FROM: Tom Ritchie Tom Ritchie
FIT Geologist
ICF Technology, Inc.
(214) 744-1641

SUBJECT: Source of drinking water for Fort Worth Texas.

SUMMARY OF COMMUNICATION

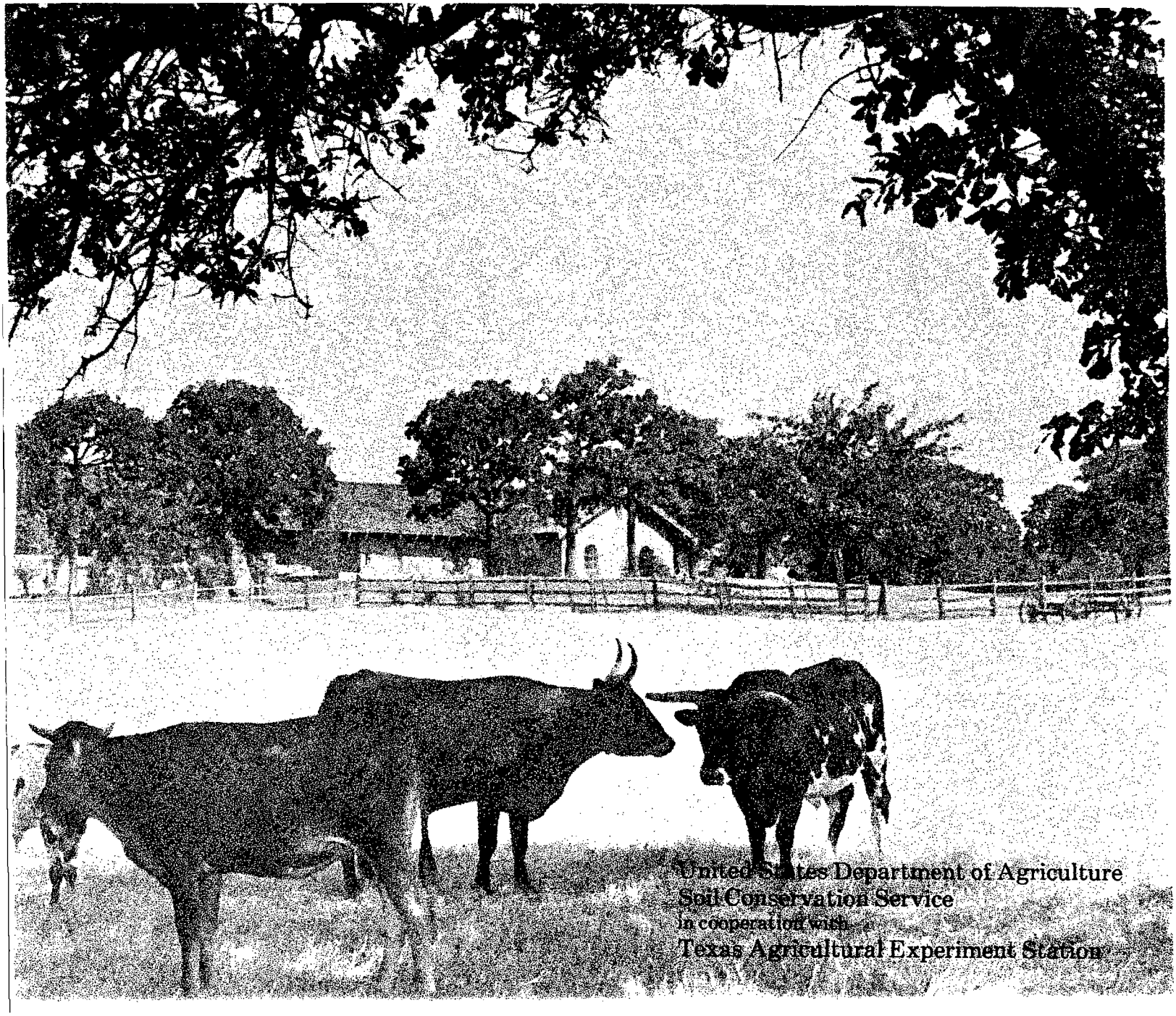
Fort Worth takes all of it's drinking water from surface water sources. The sources are Eagle Mountain Lake, Lake Worth, Bridgeport Lake, Richland Chamber Lake, and Cedar Creek Lake.

REFERENCE 11

Ref 11

SOIL SURVEY OF

Tarrant County, Texas



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Texas Agricultural Experiment Station

contents

soil series

Issued June 1981

Figure 7.—Arents, frequently flooded, are the result of gravel mining operations in flood plains of the West Fork of the Trinity River. The ponded areas provide resting and feeding areas for waterfowl.

mainly loamy, moderately alkaline, and calcareous. Natural fertility is low.

Most areas of this unit are idle. Some are grazed or used for wildlife habitat. A few large areas have been used for sanitary landfills and are now smoothed. These soils are poorly suited to use as pastureland because of the slope and because they are inaccessible by livestock and farm equipment. Areas that are reclaimed by leveling and smoothing are well suited to improved bermudagrass, weeping lovegrass, kleingrass, switchgrass, vetch, and singletary peas.

These soil materials are poorly suited to use as cropland. Flooding is a limitation. They are also poorly suited to urban and recreation uses because of flooding.

This mapped area furnishes excellent wildlife habitat for quail, doves, deer, squirrels, and raccoons. Many songbirds frequent the area for food, cover, and nesting.

The smoothed and reclaimed areas are in capability subclass Vw and the Loamy Bottomland range site.

8—Arents, loamy. Arents are gently undulating, loamy soils that have been smoothed and reclaimed after sand and gravel mining operations were suspended. These soils are mainly on terraces along major streams. In most places, after smoothing and leveling, the areas are 1 foot to 3 feet lower than the surrounding landscape. Areas are irregularly shaped and range from about 5 to several hundred acres. Slopes range from 1 to about 5 percent.

Arents are extremely varied within a mapped area. They are stratified in shades of red, brown, and yellow. They mainly consist of loamy material that has varied amounts of sand, silt, clay, and gravel. Sandy clay loam is the dominant texture, but fine sand, loamy fine sand,

and fine sandy loam are common. They all can be present in a mapped area. Arents are mainly calcareous and moderately alkaline, but may have a few strata that are neutral or mildly alkaline.

The root zone is deep. These soils are moderately productive if fertilizer is added to offset the loss of organic matter. Because they are lower than the surrounding landscape, some areas of this map unit have ponded water for short periods.

These soils are mainly used as pastureland or for urban development. A few areas have been used for sanitary landfills, and a few have not been smoothed and reclaimed. The soils are well suited to use as pastureland. Reclaimed areas are well suited to improved bermudagrass, weeping lovegrass, kleingrass, switchgrass, vetch, and singletary peas.

Reclaimed areas of this map unit are moderately suited to use as cropland. Low natural fertility; wet, depressed areas; and soil blowing are limitations. Leaving crop residue on the surface helps to control erosion and to improve soil tilth.

These soils are well suited to urban and recreation uses. Controlling outside runoff and smoothing and shaping are necessary in most places. Areas that have been used for sanitary landfills are not suited to urban development.

Areas of this map unit furnish an abundance of woody and herbaceous plants that provide excellent food and cover for deer, quail, and doves.

These soils are in capability subclass IVe and the Sandy Loam range site.

9—Bastsil fine sandy loam, 0 to 3 percent slopes. This deep, nearly level and gently sloping soil is on high terraces above the flood plains of major streams. Areas are subrounded and range from 5 to 65 acres.

Typically, the surface layer is slightly acid, pale brown fine sandy loam about 11 inches thick. The subsoil, from a depth of 11 to 56 inches, is slightly acid sandy clay loam that is yellowish red in the upper part and red in the lower part. From a depth of 56 to 80 inches, it is neutral, yellowish red sandy clay loam.

This soil is well drained. Permeability is moderate, and available water capacity is high. Runoff is medium, and the hazard of erosion is slight. This soil responds well to fertilizer. It is easily worked throughout a wide range of moisture conditions. The root zone is deep and is easily penetrated by plant roots. Some accessible areas are strip mined for the sand and gravel below the soil.

Included with this soil in mapping are small areas of Rader, Silawa, and Mabank soils. Rader and Mabank soils are in depressions. Silawa soils are in higher positions. These included soils make up as much as 15 percent of some areas.

This Bastsil soil is well suited to use as cropland. Small grains, orchards, and truck crops are grown in some areas. The major objectives of management are to prevent soil blowing and to maintain tilth and fertility. These objectives can be achieved by growing cool season legumes and leaving crop residue on the surface.

This soil is also well suited to use as pastureland. Improved bermudagrass, weeping lovegrass, kleingrass, switchgrass, arrowleaf clover, and vetch are suitable. Proper management includes weed control, fertilizing with nitrogen and phosphorus, and controlled grazing.

The Bastsil soil is well suited to most urban and recreation uses. It has no limitation that cannot be easily overcome.

Areas of this map unit furnish an abundance of woody and herbaceous plants that provide excellent food and cover for deer, quail, and doves.

This soil is in capability subclass IIe and the Sandy Loam range site.

10—Bastsil-Urban land complex, 0 to 5 percent slopes. The soil in this complex is deep and nearly level and gently sloping. It is on high terraces above the flood plains of major streams. Areas are subrounded and range from 5 to more than 200 acres.

The complex is about 40 to 60 percent Bastsil soil, 15 to 40 percent Urban land, and as much as 25 percent other soils. The Bastsil soil and Urban land are so intricately mixed that it is not practical to map them separately.

Typically, the surface layer of the Bastsil soil is slightly acid, pale brown sandy loam about 11 inches thick. The subsoil, from a depth of 11 to 56 inches, is slightly acid, sandy clay loam that is yellowish red in the upper part and red in the lower part. From a depth of 56 to 80 inches, it is neutral, yellowish red sandy clay loam.

The Bastsil soil is well drained. Permeability is moderate, and available water capacity is high. Runoff is medium, and the hazard of erosion is moderate. The root zone is deep and easily penetrated by plant roots.

The Urban land part of the complex is covered by dwellings, small businesses, and apartments and adjoining streets, driveways, sidewalks, parking lots, and other structures. These areas have been altered to the extent that classification is not practical.

Included with this complex in mapping are small areas of Rader soils in depressions and larger areas of the closely similar Silawa soils. These included soils make up as much as 25 percent of any one mapped area.

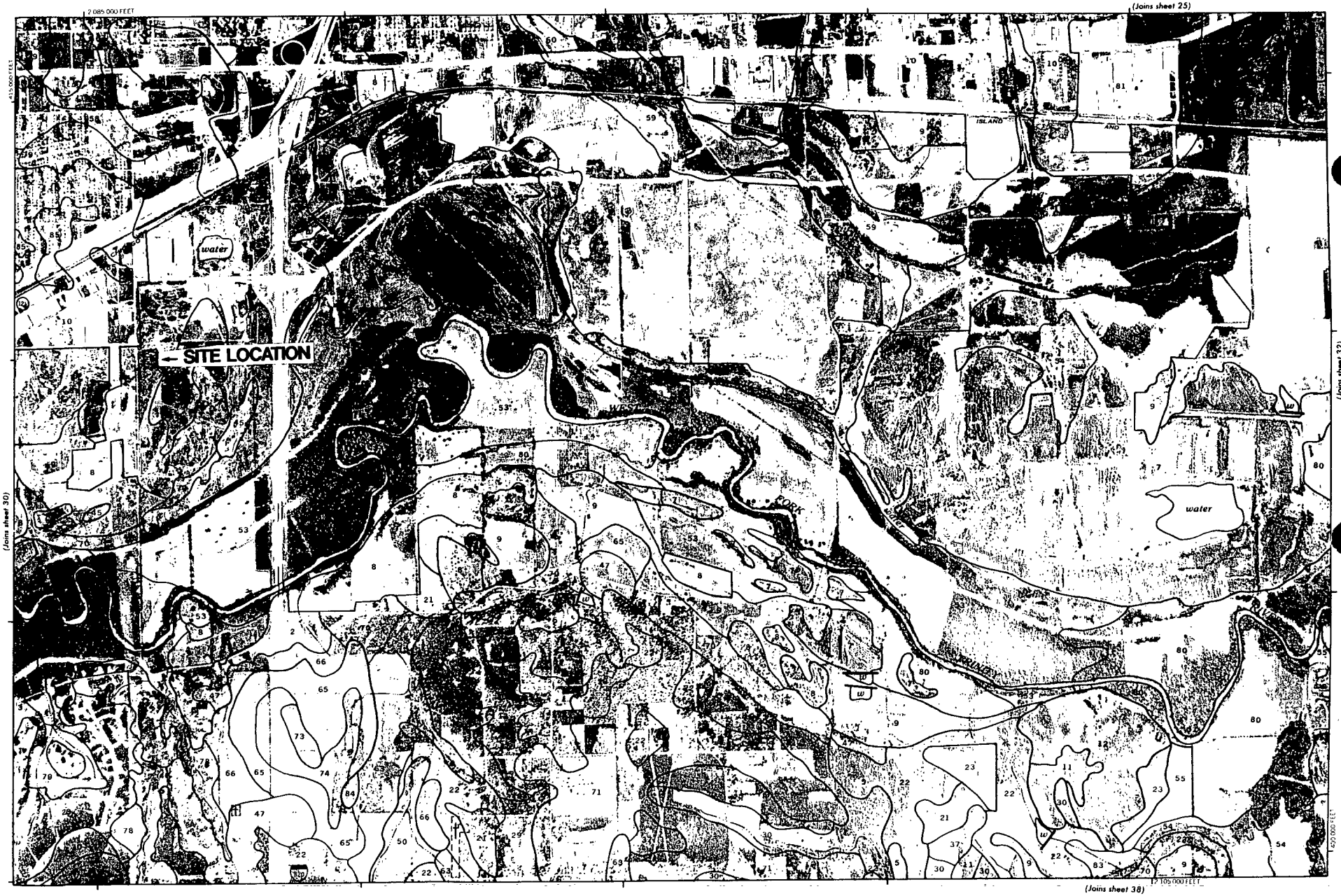
The Bastsil soil is well suited to most urban uses. Low strength, which affects roads and streets, is the main limitation. This limitation, however, can be overcome by good design and careful installation.

This soil is well suited to recreation uses. In a few areas, slope is the main limitation. Woody plantings provide food and cover for wildlife.

This complex is not in a capability subclass or range site.

11—Birome fine sandy loam, 1 to 5 percent slopes. This moderately deep, gently sloping, loamy soil is on

TARRANT COUNTY, TEXAS — SHEET NUMBER 31



REFERENCE 12

TEXAS SURFACE WATER QUALITY STANDARDS

Informational Copy

Texas Water Commission

December 1986

TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

SECTION V. DEFINITIONS AND ABBREVIATIONS.

(a) Definitions. The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise:

(1) "Ambient" - the natural conditions that would be expected to occur in waters unaffected or not influenced by the activities of man.

(2) "Best management practice" - a schedule of activities, a management practice or combination of practices, prohibitions of practices, or maintenance procedures determined to be the most practicable means of preventing or reducing, to a level compatible with water quality goals, the amount of pollution generated by nonpoint sources.

(3) "Bioaccumulative toxic" - a toxic substance which has a tendency to accumulate in organisms.

(4) "Commission" - the Texas Water Commission.

(5) "Contact recreation" - recreational activities involving a significant risk of ingestion of water, including wading by children, swimming, water skiing, diving, and surfing.

(6) "Continuing planning process (CPP)" - a document that describes the state's planning and management process and procedures for making water quality decisions. The CPP is required by §303(e) of the Clean Water Act (33 USC §1313).

(7) "Criteria" - concentrations of water constituents or characteristics which, if not exceeded, are expected to support and protect desired uses.

(8) "Discharge permit" - a permit issued by the commission authorizing the discharge of waste under Chapter 26 of the Texas Water Code, or a NPDES permit issued by the USEPA.

(9) "Dissolved solids" - the amount of material (inorganic salts and small amounts of organic material) dissolved in water and commonly expressed as a concentration in terms of milligrams per liter. The term is equivalent to the term filtrable residue, as used in the fifteenth edition of Standard Methods for the Examination of Water and Wastewater.

(10) "Effluent" - wastewater discharged from any point source prior to entering a water body.

TRINITY RIVER BASIN		USES				CRITERIA						
SEGMENT NUMBER	SEGMENT NAME	RECREATION	AQUATIC LIFE	DOMESTIC WATER SUPPLY	OTHER	CHLORIDE (mg/L) Annual average not to exceed	SULFATE (mg/L) Annual average not to exceed	TOTAL DISSOLVED SOLIDS (mg/L) Annual average not to exceed	DISSOLVED OXYGEN (mg/L) Not less than	pH RANGE	FECAL COLIFORM (#/100 mL) Thirty-day geometric mean not to exceed	TEMPERATURE (°F) Not to exceed
0801	Trinity River Tidal	CR	H						4.0	6.5-9.0	200	95
0802	Trinity River Below Lake Livingston	CR	H	PS		125	100	600	5.0	6.5-9.0	200	93
0803	Lake Livingston	CR	H	PS		150	50	500	5.0	6.5-9.0	200	93
0804	Trinity River Above Lake Livingston	NCR	H			150	150	600	5.0	6.5-9.0	2,000	93
0805	Upper Trinity River/Lower West Fork Trinity River	NCR	L			175	175	850	3.0*	6.5-9.0	2,000	95
0806	West Fork Trinity River Below Lake Worth	CR	H	PS		100	100	500	5.0	6.5-9.0	200	93
0807	Lake Worth	CR	H	PS		100	100	500	5.0	6.5-9.0	200	91
0808	West Fork Trinity River Below Eagle Mountain Reservoir	CR	H	PS		100	100	500	5.0	6.5-9.0	200	91
0809	Eagle Mountain Reservoir	CR	H	PS		75	75	300	5.0	6.5-9.0	200	94
0810	West Fork Trinity River Below Bridgeport Reservoir	CR	H	PS		100	100	500	5.0	6.5-9.0	200	[illegible]
0811	Bridgeport Reservoir	CR	H	PS		75	75	300	5.0	6.5-9.0	200	90
0812	West Fork Trinity River Above Bridgeport Reservoir	CR	H	PS		100	100	500	5.0	6.5-9.0	200	90
0813	Houston County Lake	CR	H	PS		75	75	300	5.0	6.5-9.0	200	93
0814	Chambers Creek	CR	H	PS		65	110	500	5.0	6.5-9.0	200	90
0815	Bardwell Reservoir	CR	H	PS		50	50	300	5.0	6.5-9.0	200	91
0816	Lake Waxahachie	CR	H	PS		50	50	300	5.0	6.5-9.0	200	91
0817	Navarro Mills Lake	CR	H	PS		50	75	300	5.0	6.5-9.0	200	90
0818	Cedar Creek Reservoir	CR	H	PS		50	50	200	5.0	6.0-8.5	200	93
0819	East Fork Trinity River	NCR	I			75	50	400	4.0	6.5-9.0	2,000	91
0820	Lake Ray Hubbard	CR	H	PS		40	40	300	5.0	6.5-9.0	200	93

* The dissolved oxygen criterion in Segment 0805 shall be 1.0 mg/L when headwater flow at USGS Gaging Station [illegible]

0820	Lake Ray Hubbard	CR	H	PS		40	40	300	5.0	6.5-9.0	200	93

* The dissolved oxygen criterion in Segment 0805 shall be 1.0 mg/L when headwater flow at USGS Gaging Station 0804800 (located on the West Fo Trinity River in Fort Worth, Texas) is less than 80.0 ft³/s.

TRINITY RIVER BASIN		USES				CRITERIA						
SEGMENT NUMBER	SEGMENT NAME	RECREATION	AQUATIC LIFE	DOMESTIC WATER SUPPLY	OTHER	CHLORIDE (mg/L) Annual average not to exceed	SULFATE (mg/L) Annual average not to exceed	TOTAL DISSOLVED SOLIDS (mg/L) Annual average not to exceed	DISSOLVED OXYGEN (mg/L) Not less than	pH RANGE	FECAL COLIFORM (#/100 mL) Thirty-day geometric mean not to exceed	TEMPERATURE (°F) Not to exceed
0821	Lavon Lake	CR	H	PS		40	40	300	5.0	6.5-9.0	200	93
0822	Elm Fork Trinity River Below Lewisville Lake	CR	H	PS		80	60	500	5.0	6.5-9.0	200	90
0823	Lewisville Lake	CR	H	PS		80	60	500	5.0	6.5-9.0	200	90
0824	Elm Fork Trinity River Above Lewisville Lake	CR	H	PS		80	60	500	5.0	6.5-9.0	200	90
0825	Denton Creek	CR	H	PS		80	60	500	5.0	6.5-9.0	200	90
0826	Grapevine Lake	CR	H	PS		80	60	500	5.0	6.5-9.0	200	93
0827	White Rock Lake	CR	H			100	100	400	5.0	6.5-9.0	200	93
0828	Lake Arlington	CR	H	PS		100	100	300	5.0	6.5-9.0	200	95
0829	Clear Fork Trinity River Below Benbrook Lake	CR	H	PS		100	100	500	5.0	6.5-9.0	200	93
0830	Benbrook Lake	CR	H	PS		75	75	300	5.0	6.5-9.0	200	93
0831	Clear Fork Trinity River Below Lake Weatherford	CR	H	PS		100	100	500	5.0	6.5-9.0	200	90
0832	Lake Weatherford	CR	H	PS		100	100	500	5.0	6.5-9.0	200	93
0833	Clear Fork Trinity River Above Lake Weatherford	CR	H	PS		125	125	750	5.0	6.5-9.0	200	95
0834	Lake Amon G. Carter	CR	H	PS		150	150	400	5.0	6.5-9.0	200	93
0835	Richland Creek	CR	H	PS		75	150	570	5.0	6.5-9.0	200	90

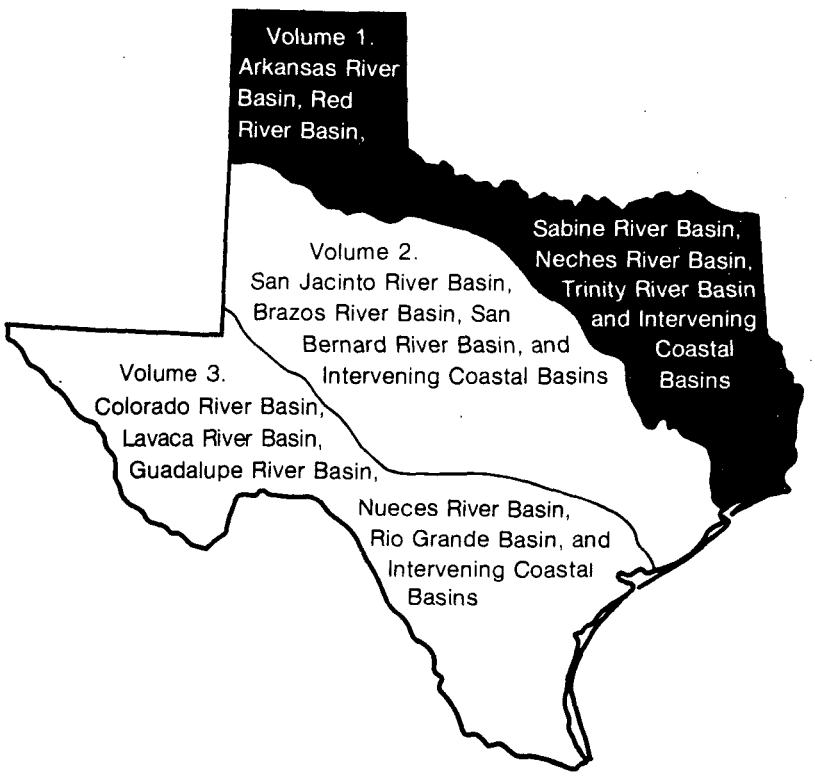
REFERENCE 13

Ref 13

Water Resources Data Texas

Water Year 1989

Volume 1. Arkansas River Basin, Red River Basin, Sabine River Basin, Neches River Basin, Trinity River Basin and Intervening Coastal Basins

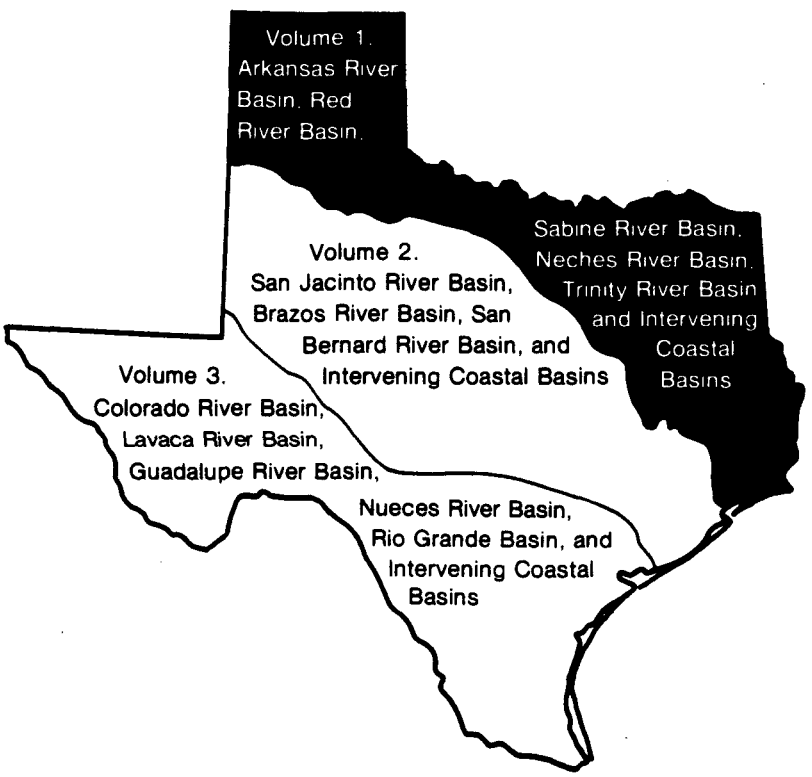


U.S. GEOLOGICAL SURVEY WATER-DATA REPORT TX-89-1
Prepared in cooperation with the State of Texas
and with other agencies

Water Resources Data Texas Water Year 1989

Volume 1. Arkansas River Basin, Red River Basin, Sabine River Basin, Neches River Basin, Trinity River Basin and Intervening Coastal Basins

by H.D. Buckner, W.J. Shelby, and H.J. Davidson



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT TX-89-1
Prepared in cooperation with the State of Texas
and with other agencies

UNITED STATES DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information write to:
District Chief, Water Resources Division
U.S. Geological Survey
8011A Cameron Rd.
Austin, Texas 78753

1990

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5. Report Date
May 1990

6.

7. Author(s)

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13. Type of Report & Period Covered
Oct. 1, 1988, to Sept. 30, 1989

14.

15. Supplementary Notes
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16. Abstract (Limit: 200 words)

Surface-water data for the 1989 water year for Texas are presented in three volumes, appropriately identified as to content by river basins. Data in each volume consist of records of stage, discharge, and water quality of streams and canals; and stage, contents, and water quality of lakes and reservoirs. Also included are crest-stage and flood-hydrograph partial-record stations, reconnaissance partial-record stations, and low-flow partial-record stations. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous measurements. Records for a few pertinent stations in bordering States also are included. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Texas.

17. Document Analysis. a. Descriptors
*Texas, *Hydrologic data, *Surface water, *Water quality, Flow rate, Gaging stations, Lakes, Reservoirs, Chemical analyses, Sediments, Water temperatures, Sampling sites, Water analyses

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
No restriction on distribution. This report may be purchased from: National Technical Information Service Springfield, VA 22161	UNCLASSIFIED	507
	20. Security Class (This Page) UNCLASSIFIED	22. Price

CONTENTS

ILLUSTRATION

08048543 WEST FORK TRINITY RIVER AT BEACH STREET, FORT WORTH, TX

LOCATION.--Lat 32°45'06", long 97°17'21", Tarrant County, Hydrologic Unit 12030102, at downstream side of bridge on Beach Street, 1,700 ft downstream from Sycamore Creek, 0.9 mi downstream from Riverside Drive bridge, 2.6 mi east of the Tarrant County Courthouse, and at mile 549.6.

DRAINAGE AREA.--2,685 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 478.70 ft above National Geodetic Vertical Datum of 1929, State Department of Highways and Public Transportation datum.

REMARKS.--No estimated daily discharge. Records good. Flow is largely regulated by Lake Worth (station 08045400) on the West Fork Trinity River and by Benbrook Lake (station 08046500) on the Clear Fork Trinity River. At times, flow is sustained by releases from the flood-detention pool of Benbrook Lake. There are many diversions upstream from this station for municipal, industrial, and other uses. Gage-height telemeter at station.

AVERAGE DISCHARGE.--13 years, 450 ft³/s (326,000 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,700 ft³/s Oct. 13, 1981 (gage height, 36.26 ft); minimum, 0.84 ft³/s July 25, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1866 probably occurred in May 1949 (stage and discharge unknown). Maximum stages have been affected by levee construction, levee breaks, and channel rectification.

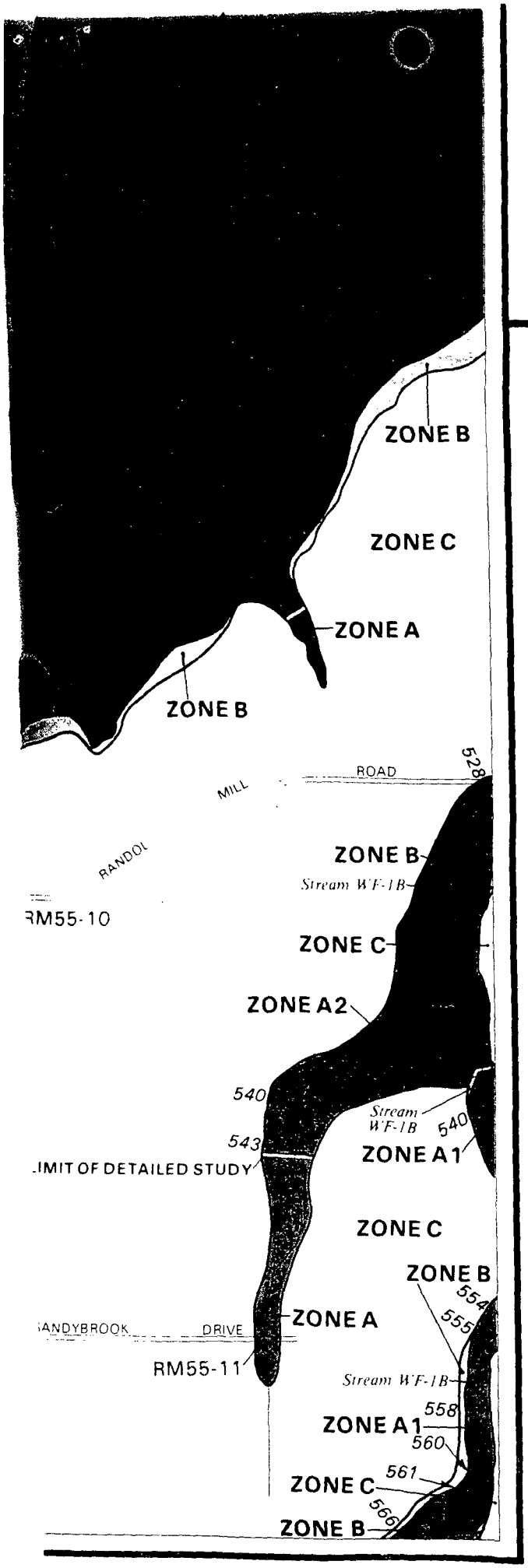
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,800 ft³/s June 13 at 1030 hours (gage height, 35.26 ft); minimum daily, 1.4 ft³/s Oct. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	111	39	13	53	75	108	938	516	3630	3430	35	14
2	68	22	14	32	78	106	525	375	4230	3700	64	14
3	46	15	14	27	146	108	344	1870	4810	4450	80	14
4	34	11	14	24	107	202	239	4720	6680	3080	54	15
5	30	8.5	16	23	66	419	152	9710	6640	3560	41	16
6	26	7.9	27	24	57	562	119	6310	6510	3520	59	20
7	24	7.4	64	23	55	432	102	4850	9610	3380	1220	59
8	18	6.6	67	22	53	271	203	2360	9960	3300	210	32
9	15	7.1	102	22	50	198	229	1480	9500	3240	104	23
10	12	7.1	312	22	50	128	223	1880	10200	2980	67	23
11	8.8	5.6	306	24	41	103	218	1690	13700	2380	55	929
12	8.1	36	79	93	70	101	220	1800	18400	1880	52	168
13	7.6	22	44	154	127	99	1150	2130	21600	987	44	1180
14	6.3	16	32	106	76	110	1500	2080	22800	632	39	195
15	5.6	42	24	54	594	114	602	419	21500	626	59	112
16	5.2	46	23	35	958	99	438	4130	19900	590	64	75
17	3.5	21	21	29	4290	89	346	16500	16500	576	66	63
18	5.0	14	18	26	941	100	311	14300	12300	555	94	57
19	5.0	187	19	26	370	103	304	12300	10000	452	59	52
20	4.1	129	21	24	724	107	385	9470	8950	252	46	78
21	3.9	38	17	24	1010	357	374	7530	8050	247	36	60
22	2.1	24	151	22	1310	214	362	7320	6830	239	30	45
23	1.9	16	147	22	1150	205	355	7370	6070	238	29	43
24	1.9	12	59	22	579	174	349	7380	4870	243	27	40
25	1.4	9.7	35	1020	322	132	345	7370	3310	237	23	37
26	335	66	24	1250	223	103	346	7300	3060	295	22	37
27	106	42	351	170	192	89	318	6480	3470	314	20	52
28	43	22	211	2220	134	8530	419	4950	3170	115	20	58
29	199	13	62	360	---	6840	523	3510	3700	61	18	41
30	103	13	40	166	---	3440	391	3190	3500	55	18	34
31	74	---	63	100	---	1480	---	3120	---	47	15	---
TOTAL	1314.4	905.9	2390	6219	13848	25123	12330	164410	283450	45661	2770	3586
MEAN	42.4	30.2	77.1	201	495	810	411	5304	9448	1473	89.4	120
MAX	335	187	351	2220	4290	8530	1500	16500	22800	4450	1220	1180
MIN	1.4	5.6	13	22	41	89	102	375	3060	47	15	14
AC-FT	2610	1800	4740	12340	27470	49830	24460	326100	562200	90570	5490	7110

CAL YR 1988	TOTAL	26307.7	MEAN	71.9	MAX	2840	MIN	1.4	AC-FT	52180
WTR YR 1989	TOTAL	562007.3	MEAN	1540	MAX	22800	MIN	1.4	AC-FT	1115000

REFERENCE 14



To determine if flood insurance is [redacted]ble in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
FORT WORTH, TEXAS
TARRANT AND DENTON
COUNTIES

PANEL 55 OF 160
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
480596 0055 D

MAP REVISED:
NOVEMBER 18, 1988

Federal Emergency Management Agency

KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations*	
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7×
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

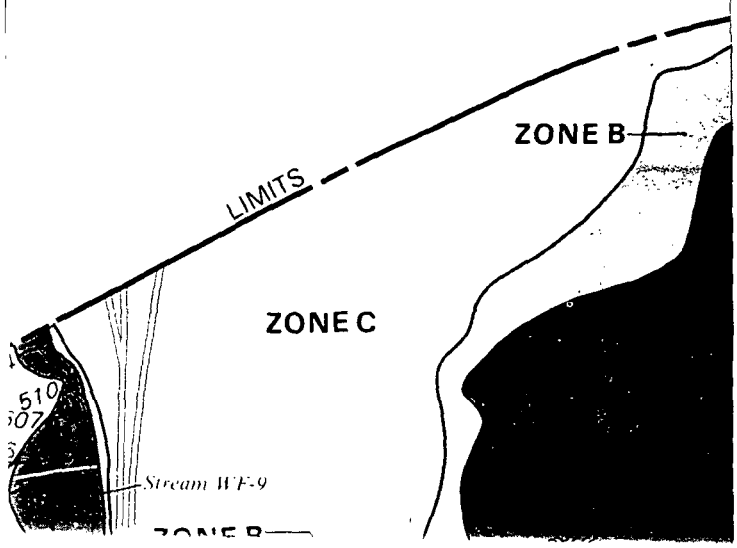
Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

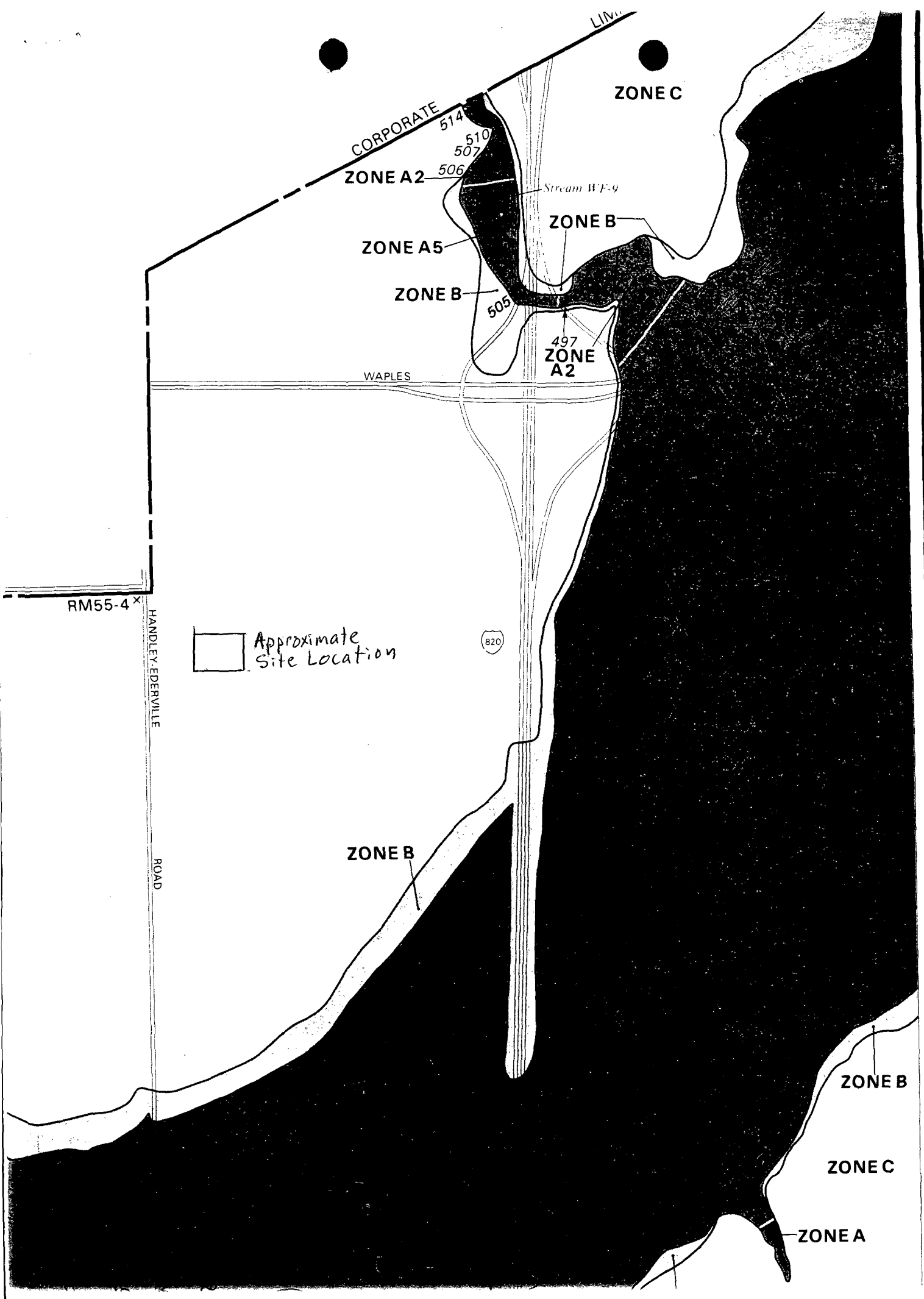
This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside special flood hazard areas. The coastal flooding elevations shown may differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:

SEPTEMBER 17, 1971





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U.S. DEPARTMENT OF COMMERCE
Lewis H. Hodges, Secretary

WEATHER BUREAU
F.W. Reichelderfer, Chief

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

NOTICE
Rainfall frequency information for durations of 1 hour and less for the Central and Eastern States has been superseded by NOAA Technical Memorandum NWS HYDRO-35 Five to Sixty-Minute Precipitation Frequency for the Eastern and Central United States. This publication (Accession No. PB 272-112/AS) is obtainable from:

THIS ATLAS IS OBSOLETE FOR THE FOLLOWING 11 WESTERN STATES: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

NOAA ATLAS 2: PRECIPITATION-FREQUENCY ATLAS OF THE WESTERN UNITED STATES (GPO: 11 Vols., 1973) supersedes the Technical Paper 40 data for these states.

All but 3 of the 11 state volumes are out of print, and no reprint is presently planned.

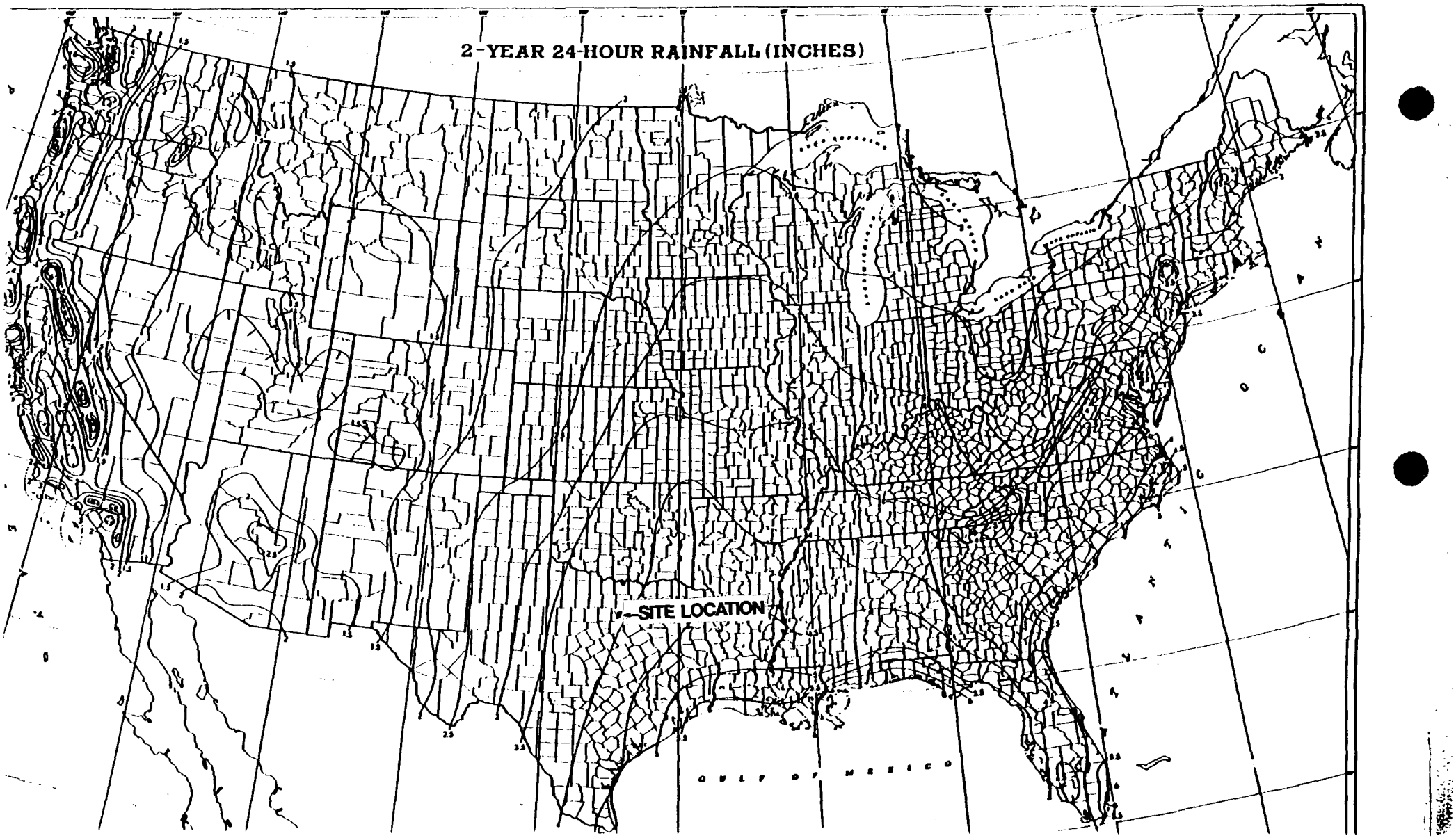
Institutions in the eleven western states likely to have copies of these volumes for their state for public inspection are:

US Department of Agriculture Soil Conservation Service Offices
US Army Corps of Engineers Offices
Selected University Libraries
National Weather Service Offices (may also have volumes for adjacent states).
National Weather Service Forecast Offices (may have all eleven volumes)

Elsewhere, libraries of universities where hydrology and meteorology degree programs are offered may shelve some of the eleven volumes.

The three volumes in print as of 1 Jan 1981 at the GPO are:

Vol	State	GPO Stock Number	Price


2-YEAR 24-HOUR RAINFALL (INCHES)
SITE LOCATION
GULF OF MEXICO

REFERENCE 16

RECORD OF COMMUNICATION

Reference 16

TYPE: Telephone Call **DATE:** 11-26-90 **TIME:** 10:45 a.m.

TO: Marsha Carpender
Economic Development
Fort worth Chamber of
Commerce
(817) 336-2491

FROM: Tom Ritchie
FIT Geologist
ICF Tecnology, Inc.
(214) 744-1641

SUBJECT: Population and area of Fort Worth and Tarrant County, Texas.

SUMMARY OF COMMUNICATION

Population figures taken from the 1985 census estimate.

Fort Worth population = 452,000.
Tarrant Co. population = 1.2 million.

Area of Fort Worth = 289 square miles.
Area of Tarrant Co. = 900 square miles.

REFERENCE 17

RECORD OF COMMUNICATION

Reference 17

TYPE: Telephone Call **DATE:** 12-13-90 **TIME:** 8:45 a.m.

TO: Carol Rathers
Public Information
Trinity River Authority
(817) 467-4343

FROM: Tom Ritchie Tom Ritchie
FIT Geologist
ICF Technology, Inc.
(214) 744-1641

SUBJECT: Fishing on the West Fork of the Trinity River.

SUMMARY OF COMMUNICATION

There is currently a ban on fishing on the West Fork from the 7th Street Bridge in Fort Worth to the I-20 crossing in south Dallas. The ban is due to clordane contamination. Typically the West Fork is fished by local residents on a regular basis.

REFERENCE 18

RECORD OF COMMUNICATION

Reference 18

TYPE: Telephome Call **DATE:** 11-8-90 **TIME:** 11:15 a.m.

TO: Dorinda Sullivan
Natural Herritage Foundation
(512) 488-4311

FROM: Tom Ritchie Tom P. Ritchie
FIT Geologist
ICF Technology, Inc.
(214) 744-1641

SUBJECT: Information concerning sensitive environments in the area of Fared (Robot) Systems.

SUMMARY OF COMMUNICATION Mrs. Sullivan stated that there are currently no listed endangered species in the area of FRS. She also stated that there are no documented sensitive environments with 15 miles of FRS. However, in downtown Fort Worth there is an inactive rookery called the Fort Worth Downtown Rookery. It was inactive the last time it was monitored in 1986.

REFERENCE 19

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

REF. 19

STATE OF TEXAS

1985

Scale 1:1,000,000

1 inch equals approximately 16 miles

10 0 10 20 30 40 Miles

10 0 10 20 30 40 50 Kilometers

Contour interval 200 feet

with supplemental 100 foot contours in coastal region

National geodetic vertical datum of 1929

Bathymetric contour intervals: 10 meters to the 200 meter depth, 50 meters to maximum depth. Dashed bathymetric form lines are used in areas of insufficient hydrographic survey data to portray the probable shape of features. *Form lines are not at the prescribed interval*

Datum is mean lower low water

The relationship between the two datums is variable

PRODUCED BY THE U. S. GEOLOGICAL SURVEY AND THE NATIONAL OCEAN SURVEY
IN COOPERATION WITH THE TEXAS DEPARTMENT OF WATER RESOURCES

Compiled from USGS 1:250,000-scale topographic maps dated 1953–80

Planimetry revised 1981. Map edited 1984

Lambert conformal conic projection based on standard parallels 33° and 45°

Universal Transverse Mercator 100,000-meter grid, zones 13, 14 and 15. 1927 North American Datum

Bathymetry and shoreline compiled by the National Ocean Survey (NOS). Bathymetry compiled from NOS Hydrographic Surveys supplemented by other hydrographic sources (see index). NOS Hydrographic Survey data comply with International Hydrographic Organization (IHO) Special Publication 44 accuracy standards or those used at the date of the surveys. Shoreline (mean high water line) from NOS nautical charts which were compiled from tide-coordinated aerial photographs. This information is not intended for navigational purposes

POPULATION KEY

HOUSTON ..... more than 100,000

ODESSA ..... 50,000 to 100,000

Victoria ..... 10,000 to 50,000

Dumas ..... 5,000 to 10,000

..... less than 5,000

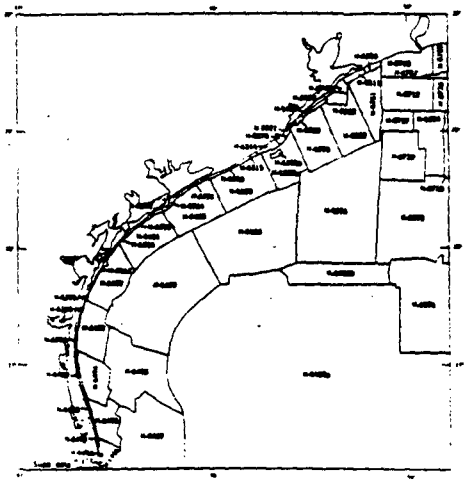
Population rounded to nearest 1000

LEGEND

- State Capital
- County seat
- City, town, or village
- Scheduled service airport
- Built-up areas are shown for towns over 10,000 population
- County boundary
- Park or recreation area
- Forest
- Interstate highway
- U.S. highway
- State highway
- Other principal roads
- Wilderness area
- National wildlife refuge
- Missions, Indian or other reservations

DEPTH GRADIENTS

NATIONAL OCEAN SURVEY
HYDROGRAPHIC SURVEY INDEX



Photographic copies of the above and other surveys may be obtained, at the cost of reproduction, by contacting the Director (C-3531), National Oceanic and Atmospheric Administration, Rockville, Maryland 20852

AND CONTOURS

FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

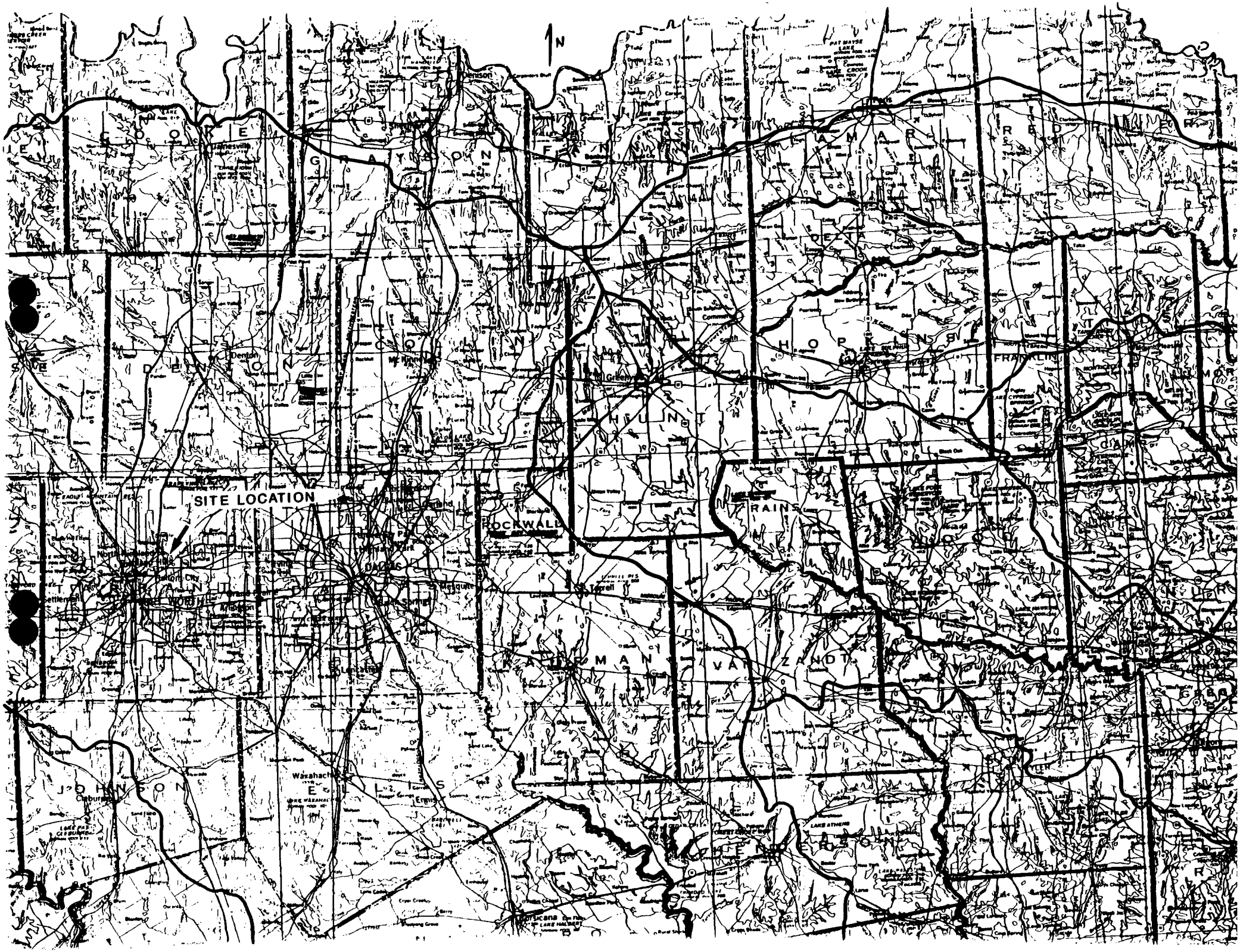
COMPILED IN 1982

REVISED 1982

NATIONAL OCEAN SURVEY
HYDROGRAPHIC SURVEY INFORMATION

SURVEY NUMBER	SURVEY DATE	SURVEY SCALE	SURVEY LINE SPACING (fathoms, fathoms)
H-377	1853	1:10,000	02-.40
H-6489	1933	1:20,000	10-.80
H-8022	1933	1:20,000	08-.18
H-8031	1936	1:20,000	08-.80
H-8032	1936	1:20,000	07-.18
H-8033	1936	1:10,000	02-.10
H-8084	1936	1:10,000	03-.25
H-8251	1937	1:40,000	20-.40
H-8252	1937	1:40,000	15-.50
H-8253	1937	1:40,000	20-.70
H-8291	1937	1:80,000	20-1.5
H-8292	1937	1:80,000	28-2.7
H-8294	1939	1:80,000	10-2.5
H-8304	1937	1:20,000	02-.20
H-8314	1937	1:20,000	05-.19
H-8315	1937	1:20,000	08-.15
H-8360	1938	1:20,000	10-.18
H-8361	1938	1:20,000	10-.30
H-8362	1938	1:20,000	04-.21
H-8363	1938	1:20,000	07-.19
H-8364	1938	1:20,000	07-.15
H-8365	1938	1:20,000	04-.10
H-8366	1938	1:20,000	05-.15
H-8367	1938	1:20,000	06-.17
H-8368a	1938	1:40,000	09-.75
H-8368b	1938	1:20,000	05-.53
H-8369	1938	1:40,000	10-.80
H-8400	1938	1:40,000	19-.73
H-8401	1938	1:40,000	22-.80
H-8402	1938	1:40,000	12-1.3
H-8403	1938	1:40,000	41-1.2
H-8404	1938	1:80,000	55-2.1
H-8405	1938	1:80,000	10-2.0
H-8489	1939	1:20,000	08-.23
H-8490	1939	1:20,000	06-.13
H-8491	1939	1:20,000	03-.14
H-8492	1939	1:10,000	02-.06
H-8494	1939	1:40,000	08-1.2
H-8495	1939	1:40,000	15-1.5
H-8496	1939	1:40,000	12-1.3
H-8497	1939	1:80,000	35-2.1
H-8498	1938-39	1:80,000	36-1.7
H-8498a	1939	1:240,000	50-18.2
H-8498b	1939	1:80,000	55-5.5
H-8501	1939	1:120,000	41-7.4
H-8712	1962	1:40,000	10-.30
H-8737	1962-63	1:40,000	15-.32
H-8738	1962-63	1:40,000	20-.30
H-8739	1962-63	1:80,000	20-.80
H-8740	1962-66	1:10,000	05-.10
H-8752	1966	1:20,000	01-.02
H-8767	1962-66	1:20,000	05-.15
H-8799	1964	1:40,000	01-.02
H-8795	1964	1:40,000	20-.30
H-8875	1966	1:20,000	04-.10
H-9060	1969	1:20,000	05-1.5

103° ZONE 13


SITE LOCATION
COOKE
GRAYSON
FANNIN
LAMAR
RED RIVER
DENTON
HOPKINS
FRANKLIN
HUNT
RAINS
ROCKWALL
KAUFMAN
VAN ZANDT
JOHNSON
ELLIS
HENDERSON
Denton
Gainesville
Sherman
Greenville
Commerce
Rockwall
Terrell
Kaufman
Waxahachie
Cleburne
Ennis
Corsicana
Athens

REFERENCE 20

Ref 20

MITRE

26 May 1988
W52-214

Ms. Lucy Sibold
U.S. Environmental Protection Agency
401 M Street, S.W.
Room 2636, Mail Code WH-548A
Washington, D.C. 20460

Dear Ms. Sibold:

Enclosed is a copy of the draft revised HRS net precipitation values for 3,345 weather stations where data were available. The data are presented by state code, station name, latitude longitude, and net precipitation in inches. A list of state codes is also enclosed.

The net precipitation values are provided to assist the Phase II - Field Testing efforts. It is suggested that the value from the nearest weather station in a similar geographic setting be used as the net precipitation value for a site.

If there are any questions regarding this material, please contact Dave Egan at (703) 883-7866.

Sincerely,

Andrew M. Platt
Group Leader
Hazardous Waste Systems

AMP:DEE/hme

Enclosures

cc: Scott Parrish

The MITRE Corporation
Civil Systems Division
7525 Colshire Drive, McLean, Virginia 22102-3481
Telephone (703) 883-6000 Telex 248923

FIELD NAME	FIELD DEFINITION
STATE-NUMBER	Characters 1-2 Cooperative State Code for each State. STATE CODE LISTING 01 Alabama 02 Arizona 03 Arkansas 04 California 05 Colorado 06 Connecticut 07 Delaware 08 Florida 09 Georgia 10 Idaho 11 Illinois 12 Indiana 13 Iowa 14 Kansas 15 Kentucky 16 Louisiana 17 Maine 18 Maryland 19 Massachusetts 20 Michigan 21 Minnesota 22 Mississippi 23 Missouri 24 Montana 25 Nebraska 26 Nevada 27 New Hampshire 28 New Jersey 29 New Mexico 30 New York 31 North Carolina 32 North Dakota 33 Ohio 34 Oklahoma 35 Oregon 36 Pennsylvania 37 Rhode Island 38 South Carolina 39 South Dakota 40 Tennessee 41 Texas 42 Utah 43 Vermont 44 Virginia 45 Washington 46 West Virginia 47 Wisconsin 48 Wyoming 49 Not Used 50 Alaska 51 Hawaii 66 Puerto Rico 67 Virgin Islands 91 Pacific Islands
STATION-NUMBER	Characters 3-6 Cooperative Station Number Range - 0001-9999.
DATA-CODE	Character 7 Data Indicator Code 1 = Maximum Mean Temperature 2 = Minimum Mean Temperature 3 = Average (Mean) Temperature 4 = Heating Degree Days 5 = Cooling Degree Days 6 = Precipitation (1951-80 Normals only)

OBS	STATE	NAME		LATNUM	LONNUM	NETPREC
2696	41	LIVINGSTON 2 NNE		30.44	94.56	17.4546
2697	41	LLANO		30.45	98.41	3.2401
2698	41	CAMERON		30.51	96.59	8.7802
2699	41	FT STOCKTON KFST RADIO		30.52	102.54	0.0006
2700	41	MADISONVILLE		30.57	95.55	12.8990
2701	41	LAMPASAS		31.03	98.11	5.9964
2702	41	TEMPLE		31.06	97.21	8.2839
2703	41	MC CAMEY		31.08	102.12	0.0235
2704	41	BRADY 2 NNW		31.09	99.21	2.3916
2705	41	EDEN 1		31.13	99.51	1.6053
2706	41	LUFKIN FAA AP		31.14	94.45	14.1089
2707	41	CENTERVILLE		31.16	95.59	13.4505
2708	41	CROCKETT		31.18	95.27	14.7831
2709	41	MARLIN 3 NE		31.20	96.51	10.5747
2710	41	SAN ANGELO WSO	R	31.22	100.30	0.6783
2711	41	PECOS		31.25	103.30	0.0278
2712	41	GATESVILLE		31.26	97.46	6.9334
2713	41	WACO WSO	R	31.37	97.13	6.7548
2714	41	MEXIA		31.41	96.29	12.6400
2715	41	YSLETA		31.42	106.19	0.0144
2716	41	BROWNWOOD		31.43	98.59	3.6480
2717	41	BALLINGER 1 SW		31.44	99.58	1.8361
2718	41	PALESTINE		31.47	95.39	14.9654
2719	41	WINK FAA AIRPORT		31.47	103.12	0.0679
2720	41	CENTER		31.48	94.10	19.7093
2721	41	RUSK		31.48	95.09	17.1421
2722	41	EL PASO WSO	R	31.48	106.24	0.0366
2723	41	COLEMAN		31.50	99.26	2.6019
2724	41	WHITNEY DAM		31.51	97.22	8.7833
2725	41	MIDLAND WSO	//R	31.57	102.11	0.1090
2726	41	LA TUNA 1 S		31.58	106.36	0.0908
2727	41	DICO		31.59	98.02	6.6495
2728	41	HILLSBORO		32.01	97.07	9.8798
2729	41	MIDLAND 4 ENE		32.01	102.01	0.1717
2730	41	CORSICANA		32.05	96.28	12.6209
2731	41	DUBLIN		32.06	98.20	6.8356
2732	41	RISING STAR		32.06	98.58	4.4163
2733	41	HENDERSON		32.11	94.48	17.2371
2734	41	BIG SPRING		32.15	101.27	0.5629
2735	41	CLEBURNE		32.20	97.24	7.9469
2736	41	WAXAHACHIE		32.24	96.51	11.0671
2737	41	ABILENE WSO	//R	32.25	99.41	1.9190
2738	41	ROSCOE		32.27	100.32	1.6700
2739	41	MARSHALL		32.32	94.21	19.1921
2740	41	KAUFMAN 3 SE		32.33	96.16	13.7363
2741	41	WILLS POINT		32.42	96.01	17.5271
2742	41	LAMESA 1 SSE		32.42	101.56	0.3682
2743	41	SNYDER		32.43	100.55	0.8168
2744	41	SEMINOLE		32.43	102.40	0.3347
2745	41	GILMER 2 W		32.44	94.59	18.6724
2746	41	ALBANY		32.44	99.18	3.2886
2747	41	WEATHERFORD		32.46	97.49	7.8519
2748	41	MINERAL WELLS FAA AP		32.47	98.04	5.6707
2749	41	DALLAS FAA	//R	32.51	96.51	9.7708
2750	41	DALLAS-FORT WORTH REG WSO		32.54	97.02	6.7013

REFERENCE 21

RECORD OF COMMUNICATION

Reference 21

TYPE: Phone Call **DATE:** 7-18-91 **TIME:** 10:25 a.m.

TO: Mark Evans
Water Rights Section
Texas Water Commission
Austin, Texas
512-371-6388

FROM: Tom Ritchie
FIT Geologist
ICF Technology, Inc.
Dallas, Texas
214-744-1641

SUBJECT: Water Intakes Along the West Fork of the Trinity River.

SUMMARY OF COMMUNICATION

Mr. Evans stated that there is one surface water intake on the West Fork of the Trinity within 15 downstream miles of the intersection of 183 and the River. He stated that it was approximately 10 straight line miles or 14 stream miles downstream. The intake is allowed to pump 50 acre feet of water per year to irrigate 25 acres of farmland.

REFERENCE 22

RECORD OF COMMUNICATION

Reference 22

TYPE: Telephone Call

DATE: 7-25-91

TIME: 9:10 a.m.

TO: Receptionist
Allied Electronics
Fort Worth, Texas
817-595-3500

FROM: Tom Ritchie Tom Ritchie
FIT Geologist
ICF Technology, Inc.
Dallas, Texas
214-744-1641

SUBJECT: Number of Employees Working at the Allied Electronics on Pebble Drive in Fort Worth.

SUMMARY OF COMMUNICATION

Allied Electronics employs 150 people at the Fort Worth, Pebble Drive location.